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★HOMES OF FAMOUS FOODS

One of the plants of International Salt Co. is illustrated on the cover of this issue. It is the works at Watkins Glen, N. Y., located on the shore of Seneca Lake in the scenic Finger Lakes district of New York State. New York City is the headquarters of International Salt Co.

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This Issue

TAKING A TIP FROM CONSUMERS

No less than 12 pages of this issue are required to tell you what you can profitably learn from consumers about your products and explain how to go about learning it. This takes the form of a symposium on determining and interpreting consumer preferences. It is edited by Washington Platt, who is with the research division of The Borden Co. and who has spent many years studying consumer-preference testing. Participating in Mr. Platt's symposium are three other authorities: Donald R. G. Cowan, recently of Swift & Co. and now with Republic Steel; C. L. Arnold, director of Kroger Food Foundation; and J. L. Bogert, Benton & Bowles, Inc.

You will search far and wide to find so much practical, workable information on determining and interpreting consumer preferences, a technic of vital importance to the success of food manufacturers. It starts on page 39.

REAPING WILDER'S OATS

You've probably heard about Dr. Wilder, the man from Mayo's who put over the enriched flour putsch down in Washington. Anyway, Dr. Wilder started something that has the milling and baking industries in a dizzy whirl and the consumer in a state of perplexity. So you may find it enlightening and reassuring to read the article on page 56 by Dr. Oscar Skovholt, well-known authority of Quality Bakers of America. Dr. Skovholt does a lot of healthy debunking and constructive criticizing.

MAYBE THEY HAVE SOMETHING THERE

It would seem from recent developments that "U. S." grade labels for canned foods have something that the old A, B, C grade labels don't have. At any rate they're causing quite a little stir in canning circles, despite the fact that most canners have not thought highly of grade labeling. Federal plant inspection lies back of the "U. S." grade labels. The cost of the inspection and grade certification isn't so much. But on pages 51 to 53 it tells all about it. While this U. S. inspection and labeling is still in the nature of an "experiment," it bears watching.

HOW MUCH DID IT COST?

It's all very well to turn out a product that's tops in its field; but unless it can be sold at a profit, no one is going to do so for very long. And to sell at a profit, it is necessary to know costs, all along the line, from raw material right through the plant until the product is sold. In some plants, it's fairly easy to determine costs. But, in a plant where raw materials are bought run-of-field and then divided into a number of grades and sizes, all sold at different prices, the task is harder. How to go about it is set forth by H. S. Schucart on page 61.

Coming

MORE BLOCKED SEA LANES

Coconut oil is one of those products that has come to us monthly from the East Indies. Because of the shortage of available shipping it no longer comes in the same volume as formerly. And because of the loss of their European markets, East Indian producers of copra coconut oil are finding difficulty in disposing of their output.

From an industrial and also from the political standpoint, the existence of this surplus supply of coconut oil is important to the United States. In FOOD INDUSTRIES for April, Gordon McBride, chemical engineer in the vegetable oil field, will review this situation.

SWEETENING THE OUTLOOK FOR LARD

What with the war blocking exports and with hydrogenated vegetable oils cutting heavily into the domestic market, the lard situation, to put it mildly, has become serious. But what to do about it? Prof. Sleeter Bull, meat expert at the University of Illinois, sees three solutions: (1) Decrease hog production; (2) increase lard exports; (3) increase domestic lard consumption. The latter alone seems feasible, and Professor Bull discusses a method of doing it—sugar rendering. This simple process greatly extends the marketable life of the lard and promises to improve its competitive position.

WHAT'S A LABORATORY FOR?

No system of quality control can earn its salt without a good laboratory, properly staffed and operated, behind it. For a small plant, this may be the part time services of a consulting laboratory; for a larger plant the full time services of one, two or more technicians in the plant's own laboratory may be needed.

As an example of how this works out in a medium-sized food plant, S. S. Epstein and M. Kirsch will tell how their laboratory is organized and operated to set up and maintain quality control in carbonated beverage manufacture.

DOING IT AUTOMATICALLY

Manufacturing history records an increasing number of processes taken from a manual operation basis and made fully automatic. While progress of this type has been more evident in other lines of manufacture, considerable progress toward continuous, automatically controlled processing has been evident in the food manufacturing field.

One of the latest advances of this nature is in the manufacturing of vinegar. A description of the equipment used for this purpose and its operations, as developed by Heinrich Frings of Bonn, Germany, will be given by Joe Lowy, formerly associated with the Frings concern, in FOOD INDUSTRIES soon.

FOOD INDUSTRIES

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LAURENCE V. BURTON, Editor

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The Talk of the Industry

★ NEVER BEFORE in the history of this publicatilon has any part of the food industry been thrown into such an uproar as the bakers and millers in February as a result of the announcement, by that self-effacing super scientist, Dr. Russell Wilder, that the govern-

ment would do thus and so about standards for vitamin-enriched flour. As one baker put it, "We are going round in circles."

★ WHO IS this Wilder person who, without any official status, undertakes to tell the world what the new standards will be six or eight months hence as if he were the great giver of laws?

★ PUT MR. *X* and Mr. *Y* down at the same table with the same food in front of them and allow them to eat their fill.

Query: Which one consumes the most vitamins?

Answer: The one who eats the most.

Right there is an important factor to be considered when attempting to decide at what level of vitamin concentration our foods will be adequate for optimum health.

A person who eats heartily of foods that may be partially deficient in vitamins conceivably might be better supplied with these dietary factors than one who eats sparingly of foods that are more adequately supplied with vitamins. Hence in harking back to the good old days of great-grandfather and his "less refined" or "undenatured" foods, don't forget that he probably worked three times as hard as anyone today and ate at least twice as much, thereby getting at least twice as many vitamin units as we of today.

When anyone inadvertently praises the better quality of the foods of bygone days, following the recent example of Winston Churchill, you might quote the Bible, Ecclesiastes 7:10:

"Say not thou, What is the cause that the former days were better than these? for thou does not enquire wisely concerning this."

★ OCCUPATIONAL DEFERMENTS are being sought by many manufacturers who are facing the loss of key men under the Selective Service Act. Always remember this, however. There are no indispensable jobs. It is the man who is indispensable —not the job. You cannot, therefore, get a blanket deferment for a certain type of job.

And you can get an occupational deferment for an employee for only six months at a time, during which you must train another man to replace him. If, in the meantime, you put him on other work, you prove by your own act that he is not the indispensable man.

★ BACK in the gloomy days of 1933 one food manufacturer defined prosperity as doing business at a profit. Today the Cleveland Trust Co. defines it as "a condition in which you can sell what you can do and get in return the things you want."

★ THE NEED for proper understanding of the difference between undernourishment and malnutrition is stressed by Dr. Joseph S. Davis, director of Food Research Institute, Stanford University, in a recent article, "Food In a World at War" (*Harvard Business Review,* vol. 19, 133, 1941).

Undernourishment, according to his view, is a deficiency of calorie intake, but malnutrition is a deficiency in proteins, vitamins, minerals, or "balance," which are essential to optimum nutrition. He fears that both these evils will develop in Europe during the war.

★ A FOREHANDED Baltimore food manufacturer in a whimsical mood suggests that if war should really come to our shores he will protect his plant from bombing by painting a huge sign on his

roof. The sign will be an arrow and will carry the words: Glenn L. Martin Airplane Factory 1 mile."

FOR SOME TIME we have been wondering what has become of the employees of working food exhibits at the New York World's Fair. After two seasons on exhibition they must have become so accustomed to slow motion

operations that it will be very difficult for them to reacquire the speed that will guarantee them a job in industry, their personal good looks notwithstanding.

Place of the Food Industry In National Defense

IF THE NUMBER of bewildered questioners who ask FOOD INDUSTRIES about the role of the food industry in the National Defense Program is a measure of the total misunderstanding existent in the nation, then it is high time that the place of our industry be made very clear to all. In June, 1939, we devoted 16 pages to an analysis of the problem as it then appeared, believing that the then existing crisis justified the effort. There is, however, too much that otherwise deserves our attention today to reprint that analysis. But, it can be summarized and brought up to date in a very few paragraphs.

Our population is about 135,000,000 persons. If we mobilize an Army of 4,000,000 and a Navy of 500,000, our population is still 135,000,000. Mere mobilization does not create any more people to feed. And, except for the fact that the armed forces have certain specialized requirements as to their foods, the total food consumption of the nation is only slightly altered by mobilization.

What are these specialized requirements? The Army has its own ration plan, carefully worked out in the light of the best scientific knowledge of the day. The plan covers both the amount of food per man and the manner of packaging. The Navy's requirements can be considered from the same viewpoint. Because of the exigencies of military life, plus the fact that soldiers and sailors are hard working men and must be well fed, the needs of the armed forces are not only for more food than the same men would eat in civil occupations, but also for different amounts of the various foods. Thus, more meat, more butter, more vegetables and more cereal products will be consumed per man than would be the case were he on his own. There will be decreases in the amount per man for fluid milk, cheese and fruits.

National demand for certain foods under full mobilization will therefore present striking changes although the total is only slightly increased.

Meat Consumption To Increase

Most striking of all will be the 6 percent increase in meat consumption for the entire nation unless the civilian population decides or is required to eat less meat. (Harriet Elliott, and other shedders of tears over increasing meat prices to the consumer who is to be defended by these boys, please take note.) Total calculated butter demand under full mobilization will increase 5.5 percent above the normal peace time civil demand. For further details see June, 1939, FOOD INDUSTRIES, especially Table VII on page 310. In short, the expected food demand by the nation under arms, but not at war, is calculated to increase by a trifle less than ½ of 1 percent. And if we get into a shooting war, the probable food demand will be further increased only enough to compensate for food actually lost by accident or enemy acts.

Is the food industry of the United States ready to take care of a war time load? Is it possible to produce the calculated 0.5 percent increase in production? The answer is an unqualified "Yes."

If that be true, then what is there left to talk about?

Plenty. With all the current anxiety to produce airplanes, engines, guns. powder, tanks and ships, we are apt to lose our perspective of the national needs for foods. The Army and Navy need such stupendous quantities of the materials of war that we lose sight of the homely and prosaic fact that the biggest job of the food industry is to feed the civil population rather than to feed the armed forces.

Look at it quantitatively and you will get the idea. From the viewpoint of production, which is the bigger task, producing the food for 130,500,000 persons in civil life or for 4,500,000 in military life? The civil job is just about 29 times

Hors d'Oeuvres

★ *Michigan Bean Shippers Association is shocked that our soldiers and sailors are not to live on beans. "Why, American solders won the Revolution on beans, fought Gettysburg on beans and broke through the Hindenburg line on beans." —Just think what they'll be able to do this time on a good diet.*

★ Menu of a London restaurant:

Siren Soup
Heinkel Hot-pot
Jaguar Jelly

★ *Sunday morning delivery of milk has been stopped in Columbus, Ohio. What will the 4-a.m. man-about-town do without his milkman to make the house stand still while he puts the key in the door?*

★ Fordham's football team, which lost to Texas A & M in the Cotton Bowl on New Year's Day, trains on Knox gelatine. Maybe they should try Jell-O.

★ *The Navy has purchased from H. L. Piel Co., Baltimore, $117,376.11 worth of sauerkraut. Could this be bait for Fritz?*

★ Clarence Saunders is closing the "Keedoozle" in Memphis, the grocery where customers select the items with an electric key and find them wrapped and waiting at the cash register. Perhaps the customers discovered that what makes buying easy makes spending easy.

★ *It takes 2½ hens to lay the 200 eggs you eat a year and another hen to cook them.*

★ On Jan. 2 the British meat ration was reduced to 29 cents per person per week. That would be about a pork chop and a half in New York City.

★ *The name of the famous Italian you-stay-with-'em-boys African general—Whiskers Bergonzoli—sounds like some kind of moldy cheese.*

★ Down the China Sea in Singapore they stew in the juice of air so humid it drips and so hot the mercury coasts to 100 in the deep shade. 'Tis no place for a man, much less a cow. Yet 120 cows live there so contentedly they give up to 60 lb. of milk a day. These bovines stall around in a barn air conditioned by Carrier to 75 deg. and humidity in the comfort zone. It's not a stunt, just cow economics.

★ *The Italian people have a song about coffee, according to a wireless to the New York Times. It goes like this:*

When in Rome a king held sway,
I drank coffee every day.
An emperor he became as well.
Still I sniffed that coffee smell.
When he seized Albania's land,
Even that mere smell was banned.
If Benito stays, I know,
Even the coffee pot will go.

★ Mussolini has decreed the death penalty for Italians who hoard food. In Italy life hangs by a straw of spaghetti.

★ *Says the USDA, there's no danger of defense in this country being hampered by lack of food or fiber. But Italy isn't so fortunate. She lacks both—no food in the stomach and no fiber in the backbone.*

★ American Crab Packers Committee disputes Japan's claim that the giant "spider" crab is a Japanese fish. But if its a big crab its as likely to be Japanese as anything.

F.K.L.

as large as the military job. Which is not in any way to detract from the *vital importance* of the relatively smaller military forces. The Army and the Navy will get the usual fare as long as any food is available, but the civil population will be compelled to subordinate its needs and desires to the military.

No Need for Expansion

At the moment there is no need for expansion of food-processing facilities, and no such need is foreseeable in the future unless the British blockade of Europe is relaxed to permit export of food to conquered nations, or unless Great Britain needs to acquire food from the United States. But there is a decided need for an expansion of the vision and the thinking of the men who manage the food industry with respect to potential problems of the future. For it will be largely up to the industry to take care of the civil population's food needs, no matter what may happen.

Events in the Far East are becoming increasingly ominous. Japan's steady march toward the Dutch East Indies and the Malay Peninsula will soon lead to a clash if it continues. Although the United States may not be a party to the conflict, its outcome will be of great importance to us, for it may mean an interruption of our rubber and tin supplies. If the interruption should occur, about one-half of all the food manufacturers of the country will be facing problems of varying severity—problems which, we regret to say, are receiving almost no attention from those who ought to be actively planning potential methods for their solution.

If a real emergency should unhappily occur and catch the food industry unprepared, the wrath of the civil population over any defective plans which fail because of hasty improvisation will be unpleasant, to say the least. The emergency, if it comes at all, will be sudden and its duration will be quite unpredictable.

The food manufacturer's biggest job is to supply the needs of the civil population, come what may.

Why Jump the Gun?

CONSIDERABLE CONFUSION has been evident among millers, bakers and others in the food industries since the committee on food and nutrition of National Research Council, supported by statements issued by millers' and bakers' associations, gave the green light to the production of "enriched" flour and bread. The announcements came with what was mistaken by many for the authority of a government food standard. The question has been raised as to whether these unofficial announcements indicate any change in the food standards procedure of the Food and Drug Administration.

Of course, that is not so. Standards for flour to which vitamins and minerals have been added, and for bread made from such flour, will be issued in the future when the Food and Drug Administration has completed the preliminaries set down in the Food, Drug and Cosmetics Act. And these standards, when issued, may or may not conform to the "enriched" flour announcements by Dr. Russel Wilder. In any case, the standards when issued (probably by July or August) must, by law, be based on the facts as brought out at the standards hearings and in other ways provided in the statute.

Why, then, were the "enriched" flour announcements made? The answer seems to be that, prior to these announcements, agreement had been reached among interested nutrition experts and certain representatives of associations of the baking and milling industries as to what vitamins and minerals could be readily and economically added to flour and bread at this time, within the limits of the testimony given at the flour standards hearings in 1940. Sensing an opportunity for successful promotion of this new flour now, while public interest in better health as a defense measure is high, those who were zealous for flour enrichment seized on the occasion of the agreement for vigorous action.

And, certainly, such action was well within their legal rights. Anyone is free under the law to promote the manufacture and sale of food, provided it is wholesome, labeled as directed by law, and complies with existing laws and regulations. The principal difference made by the existence of a standard for a food is that then it can be labeled with the accepted name without ingredient declaration on the label.

The milling and baking industries have been free right along to produce the "enriched" products, as individuals. But nation-wide action along these lines on the part of both industries was sought, now, at what seemed the psychological moment. Undoubtedly a clever procedure, but it caught many bakers and millers totally unprepared and also aroused confusion as to whether or not a forthcoming government standard was being forecast. These difficulties could have been avoided by a less precipitate announcement, differently worded. For certainly, if the new products prove to be wholesome, useful and popular, they will continue to be made and marketed, with or without the determination of official standards. The interests of all would have been better served if the over-zealous had "kept their shirts on" until everyone concerned was ready to go ahead.

Go to the Packaging Conference

EVERY YEAR the Packaging Conference and Exposition of the American Management Association, 330 West 42 St., New York, holds much that is valuable to production men in the food industries. This year it is to be held at the Stevens Hotel in Chicago, April 1 to 4.

Not only do we urge you to study the exhibits, but we strongly counsel that you plan to attend the discussion sessions where every phase of packaging of current importance is discussed. A modest fee, that is well worth the money, is charged for attending the meetings.

Screwey—Just Plain Screwey

TO PROTEST about the inconsistencies of our government is merely to recall what every thinking person knows all too well. Unfortunately, however, those who are able to think clearly are always in the minority; which is one of the handicaps of majority rule and one of the prices of liberty. Nevertheless, the protest must be made.

One branch of the food industry engaged in the preservation of perishable foods (canning) has been exempted from overtime penalties under the Wages and Hours Law for 14 weeks every year. On the other hand the Walsh-Healey Law requires those who manufacture on contract with the government to pay these overtime penalties.

Since mobilization of the Army, the government has become one of the largest single buyers of canned foods and in theory should protect itself by contracting for futures, especially in a period of expanding demand. To facilitate that end the War Department recently requested exemption of canners from the application of the overtime provisions of the Walsh-Healey Act, but the request has been, in effect, pigeonholed.

Which means that canners who make future contracts with the Quartermaster Corps for goods to be manufactured to order must agree to Walsh-Healey Act penalties for overtime. There never was a normal crop year in which canners were not compelled to work overtime. And those who have tried to build up two or three shifts of employees for a few days or weeks know that such extra shifts are well nigh impossible to obtain in most canning regions.

So what?

A canner who sells the Army must have higher costs when he packs the Army's foods to order—costs for which, of course, the Army must pay. He cannot in any practical sense segregate his Army contract operation from his normal commercial pack because he cannot know in advance what part of his pack is going to meet the required Army grade of quality. Yet, if he did attempt this impossible problem of segregation, he would immediately face equally impossible problems of personnel relationships. For what employee would be content to be paid straight time for the inevitable overtime if his fellow workers were getting time-and-a-half for overtime merely because identical goods on which he is working were destined for the U. S. Army? No canner would be foolish enough to get caught on that snag.

Thus, no canner is likely to sell more than 10 to 20 percent of his pack to the Army on a future contract, yet the entire production cost of his pack will be from 3 to 5 percent higher than otherwise if he were to sign a contract under the Walsh-Healey Law.

In essence, therefore, the Army must become a spot goods buyer of canned foods. Inevitably this means that in a great many cases the Army will have to pay speculator's profits. It follows inevitably because the Walsh-Healey Law does not apply until a contract is awarded. And there is nothing to prevent futures' buyers from grabbing up at the time of the pack the grades and sizes the Army wants, and then reselling them to the Army. Only *after* such speculative purchase is made do Walsh-Healey standards apply, the only net result being that the Army pays more.

There is altogether too much similarity between preservation of social gains and the events preceding the destruction of La Republique Francaise.

Are we arming ourselves for National Defense, or are we merely pretending to do so?

Dangerous Mud Slinging

TO FORGET that the record of testimony in Federal food standards hearings is a public record that is presumably in existence forever, and may arise in the future to torment the witnesses who made the records, is a serious error. In fact, some of the more recent mud slinging in the heat of controversy may ultimately classify as dangerous.

Let those whose products are directly competitive, put a vigorous case for the merits of their respective wares. Let the fight be determined, but let it be clean—even as the sucrose *vs.* dextrose controversy has been clean. But to assail the quality of a competing product in an inter-commodity fracas is unwise—to state it mildly. It reminds one of a very short-lived advertising campaign a number of years ago when a company advertised: "Our fish guaranteed to contain no worms." Competitors soon convinced the offender that such mud slinging would put the entire industry out of business, including him.

The only safe and sound policy is to boost one's own side with all possible vigor. Bring in all the necessary constructive and supporting data, but be very wary of destructive attacks. Mud spatters very easily.

Nicotinic Acid Is Not Vitamin B_6

NO LESS AN AUTHORITY than Dr. E. M. Nelson, chief of the vitamin division of the Federal Food and Drug Administration, has stated: "As continued exidence of the multiplicity of vitamin B has appeared, confusion in nomenclature and identity of factors has also grown."

That statement explains, in a large measure, the troubled state of mind, even on the part of experts, when discussing the B-complex and the relation of its various members to public health—the cure and prevention of dietary deficiency diseases. It also explains the erroneous interchange of the terms "B_6" and "nicotinic acid" when the anti-pellagra factor of the B-complex is under discussion, even in technical groups and publications. The editorial on page 36 and the news story on page 68 of the January FOOD INDUSTRIES are specific cases in point.

Nicotinic acid is now regarded as the principal factor in the cure and prevention of human pellagra, which is still looked upon with question as a probable multiple-vitamin dietary deficiency disease. It is chemically identified as 3-pyridine carboxylic acid, a white crystalline fine powder.

Vitamin B_6, since its isolation, has been chemically identified as pyridoxine, commercially available as the hydrochloride, a white crystalline coarse powder with a salty taste. Like nicotinic acid, it is a derivative of pyridine. Preliminary clinical tests indicate that it may have value in the treatment of human pellagra, particularly in those cases where symptoms do not fully respond to treatment by other fractions of the B-complex such as nicotinic acid.

However, the fact remains that regardless of their similarity, nicotinic acid and vitamin B_6 are separate and distinct chemical compounds. They should not be confused with each other as having identical properties and powers; even in a dietary sense.

Ascertaining Consumer Preferences

YOU MAY think it is easy to find out what a group of consumers may think about several variations of the same label, package or product. For simplicity's sake we shall call them *A*, *B* and *C*. Sometimes it is easy; more often it is not. If you have never tried to get a frank, brutally honest and unbiased opinion about a food, a package or a label from a lot of women, you have an important new experience ahead of you.

It is assumed that you really want to know the truth, that you and your business associates are intellectually honest, that you are not attempting to prove that your particular pet is hotsy-totsy with the public, but that you are really after the facts. All right, there is a right and a wrong way to go after the facts.

And after you have obtained a lot of so-called facts, what do you do then? Suppose the votes for *A*, *B* and *C* are in the ratio of 5, 4 and 3. Is *A* the product to market? Shall we neglect the seven other voters to preferred *B* and *C*? A food manufacturer recently told us that such a choice was very simple—that the public in this case had chosen *A*. But that is not the best conclusion from such a vote.

Still more important than getting the honest opinions of the public expressed as votes is the matter of what to do next. If we repeat the test and the same people vote some other way, then where are we? And what do we do now?

It is all so perplexing, and so many inquiries have come to FOOD INDUSTRIES asking if we know any sources of enlightenment, that we decided to do something about it. And knowing that Washington Platt of the Borden Company Company has been studying the problem for more than a decade, FOOD INDUSTRIES invited him to act as a consulting editor and to arrange a symposium discussion of it by the best informed men he could locate.

The results are most gratifying. In this issue you will find more practical common sense on how to determine what people like than we ever saw assembled before. It is something you will want to read carefully and keep on hand. (Reprints are available at the offices of FOOD INDUSTRIES for 25 cents each.)

Washington Platt, C. L. Arnold, Donald R. G. Cowan and Dr. Lyman F. Bogert are to be complimented for placing on a sound and workable basis, the technique of testing consumer preferences and the interpreting of the results.

What the Manufacturer Can Learn From Consumers About Foods

How to obtain accurate consumer opinions, how to interpret them correctly and how to use them as a guide in improving or developing a food product so that it will appeal strongly to a chosen market. For all food manufacturers.

A Symposium

Edited by WASHINGTON PLATT, ***Research Division, The Borden Co., Syracuse, N. Y.***

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The dining table in the consumer's home is the real testing "laboratory" for a food manufacturer's product. And by determining the preferences of men, women, boys and girls at the point of consumption, manufacturers can improve their product so as to obtain greater sales with less sales effort and expense.

Globe

Why Consumer-preference Tests?

By WASHINGTON PLATT, *The Borden Co., Syracuse, N. Y.*

MANY executives of industrial concerns assume that they are in close touch with the consumer preferences for their products. Frequently this is not the case. Their manufacturing department manufactures their product according to preconceived notions. Their sales department sells not to the final users, but to dealers. Great sales effort results in a reasonable volume of sales, but sales might be much greater if some simple changes were made in the product to make it accord more closely with consumer desires. With the millions of dollars spent for advertising, it is surprising that so little is spent for finding out by direct study what the consumer really does want.

Some concerns are already well aware of the value of a direct study of consumer preferences. An ever increasing volume of such tests is carried out each year. Further evidence is shown by the appearance of a few excellent books on this subject and by occasional magazine articles.

One method for the determination of the "eating qualities" of food products is scoring by a small group of trained and experienced judges. This is a very common method as exemplified in the scoring of butter, ice cream and bread. The technic of scoring food products has been described in detail by Platt.

In using this method we assume that the conclusions of the judges are the same as those of the general body of consumers. With more or less standardized foods, such as butter, this may (or may not) be the case. With most foods we have no right to make such an assumption. To find out what the ultimate consumer likes, we must go directly to this ultimate consumer and find out what he prefers. This is called a "consumer preference test." The present article is devoted to such consumer preference tests for food products. This differs from sales analyses, market surveys, and so forth, because the whole object is to determine the likes and dislikes of consumers for the given food product. This is evidently quite different from mere pantry surveys.

In spite of the amount of time that has been spent on this subject and the excellent and reliable work of some companies, it is surprising how much misunderstanding still exists in the minds of many business executives, and it is even more surprising how many tests of this kind are carried out in a way that is inefficient, unreliable or positively (and in some cases purposely) misleading.

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Although the general principles are simple and almost self-evident, their application requires judgment and much hard work. In fact, there is a technic involved which must be learned if reliable results are to be obtained, just as the chemist must learn his own technic before he can hope to perform chemical analyses.

The purpose of this symposium is to discuss briefly some of the general principles which apply to *all* forms of consumer preference tests, and then to consider more in detail some of those special problems which appear when *food* preferences are to be determined.

General Consideration

1. The persons consulted must be fairly representative of the public concerned.

Those conducting the public opinion polls have clearly demonstrated the value of obtaining the opinions of a small representative sample of the population as a reliable indication of the opinions of the whole people. This, of course, is the method of the consumer test of an industrial product.

2. The study must be entirely unbiased. The commonest and the most unpardonable fault in any study of this kind is any suggestion of bias. The only object should be to arrive at the truth. Bias may arise from the phrasing of the questions, the arrangement of the samples or the selection of the individual testers.

3. Testers must not know the identity of the samples on which they are stating their opinions. Otherwise, brand names or known composition will generally prejudice their judgments.

4. Each tester must give his opinion independently without knowledge of the opinions of others.

Special Considerations For Food Preferences

1. Judgment must be made under natural conditions for the consumption of the given food.

2. When two foods are judged side by side there is a tendency for the stronger to predominate. The sample with the weaker but perhaps more delicate and appetizing flavor is at an unfair disadvantage when tested beside a more strongly flavored sample.

3. Guesses must be eliminated. In judging food samples most people will express a preference even when no real preference exists. If asked to repeat the test, preferences might well be reversed. It is important to recognize these guesses as contrasted with definite choices.

You can teach the consumer how to use your product, but you can't teach her to like it. Wise food manufacturers let her do the teaching when it comes to developing a new product or improving an old one so that it will be successful in a chosen market.

4. Sometimes a food is preferred when a bite or two is taken, whereas we should quickly tire of it if we had to eat a whole serving. This problem appears in still more pronounced form when the foods under consideration are normally eaten every day, such as bread, coffee or milk. In judging these foods, the question as to whether we will tire of them on constant repetition is of the first importance.

The final problem in any consumer test lies in the interpretation of results. When do the votes demonstrate a real difference in consumer preferences? On the other hand, when is the difference accidental?

The articles which follow are written by those having much experience in the determination of consumer preferences for food products. They throw light on many of the foregoing problems. In some cases, it will be noted that the different contributors have somewhat different opinions. Such differences are to be expected in such a relatively new form of activity.

Developing and Improving Foods By Consumer Testing

By DONALD R. G. COWAN,* *Manager, Commercial Research, Republic Steel Corp., Cleveland, Ohio*

PRODUCT control might be interpreted as a conscious regulation of everything pertaining to a product, such as its physical characteristics, price, channels of distribution, methods of sales, and so forth. Because space will not permit consideration of all these aspects of product control, attention will be confined to the physical characteristics and to the others only insofar as they are modified by physical changes in the product.

The profits to be made and risks to be borne in striving to keep ahead of competitors in product development and improvement have impelled many leading concerns to adopt methods of keeping adequately informed on market tendencies. Market surveys, for the purpose of obtaining this information, must be properly conducted, preferably by market research experts rather than by salesmen, who usually are unable to avoid suggesting ideas and answers in their customary promotional manner.

It is desirable to stress the importance of the direct testing of products by consumers, partly because of its newness in market research, but principally because of the peculiarly basic information thus obtained. Direst testing reveals the characteristics of products which consumers like or dislike in comparison with competing products. To a business concern, nothing can be of greater importance than to know that its promotional effort is not handicapped by an inferior product or one that is not adapted to the market being exploited.

Under the guidance of the market research staff at Swift & Co., information has been obtained from over 100,000 consumers, regarding the flavor, aroma, texture, appearance or tenderness of a great variety of foods, including ham, bacon, lard, shortening, butter, cheese, sausage, meat specialties and many others. One study revealed that a comparatively new Swift product was less pleasing to consumers than other competing brands. After discovering the reasons, changes were made in the color, texture and flavor, which not only caused it to be preferred by consumers in subsequent tests but also reduced its production cost. Since that time the sales of the improved product have rapidly increased. Other tests have indicated the gradual changes taking place in consumer tastes and fancies, and have enabled the company's chemists and production managers to develop new products and to modify those already being marketed in order more completely to satisfy consumer demand.

DONALD R. G. COWAN

It is still the common practice in many companies for a committee or panel of executives to inspect their own products from time to time and compare them with those of competitors. The presumption that such a committee may know what consumers prefer in a food product is often erroneous. The production man on the committee has built his own ideas into the product for so many years that even in the dark he could pick out his own creation and quite honestly vote it to be the best because it satisfied the requirements which he believed buyers wanted. For instance, he may prefer a pronounced flavor, not realizing that consumers have gradually turned to milder flavors since the time when he was a younger, more disinterested consumer. Again, the chemist is unable to disassociate consumer reactions from his chemical analyses and combinations, and may believe that the ice cream containing the highest percentage of butterfat is the one which consumers must prefer. Similarly, the operating man minimizes the importance of points of superiority in a product, especially if they necessitate a considerable increase in manufacturing expense. No matter how important are the positions held by various members of the committee, their senses of taste, smell, hearing and sight vary in keenness.

Thresholds of Taste

In determining the acceptability of taste and aroma of foods, the suggestion

* Until very recently, Mr. Cowan was chief statistician, commercial research department, Swift & Co.—Editor.

has been made that judges be selected who have average "thresholds"* of taste. Discovery of these may be accomplished by serving them with increasingly concentrated solutions of caffeine for bitterness, sodium chloride for saltiness, sucrose for sweetness, tartaric acid for sourness, glutamic acid and monosodium glutamate for mixed tastes, and asking them to indicate the points of minimum taste perception and maximum satisfaction. In one such test, a wide variation in judgment has been found and some interesting conclusions have been reached:

1. Judgment on taste is usually influenced by smell.

2. Some people have lower thresholds of taste, or, in other words, perceive lower intensities of flavors (or aroma) and are sensitive to more delicate flavors.

3. People who are able to detect more delicate flavors have, as a general rule, lower points of maximum satisfaction. That is to say, persons who are sensitive to the most delicate trace of sweetness will reach the point of maximum pleasure with less sugar used in their coffee. Two spoonfuls of sugar will make coffee distasteful for some people.

4. When a small number of judges are used, those possessing average thresholds of taste seem to be the most reliable, and probably represent more nearly consumer preference. Those with extremely low thresholds seem to be more erratic in their judgments. Those with high thresholds may be unable to detect any real differences. When judges having high or low thresholds of taste are used, they should have equal representation in every group and every series of tests, if series are to be compared.

Besides the variations in sense perceptions indicated by this and similar experiments, there are other reasons why it is desirable to obtain the judgment of large numbers of people selected on the basis proposed or merely at random from various classes of consumers. Trained judges tend to acquire more acute senses of taste, smell and sight. Furthermore, repeated testing may develop a familiarity amounting to a preference for one combination of characteristics as against other combinations. For instance, the repeated testing of products 1 and 2, products 1 and 3, 1 and 4, etc., may gradually build up a greater perception of 1 and confusion of the others. This bias in judgment, which grows gradually as a company's product is compared with competitive products, makes commercial decisions valueless and should be avoided.

But even the selection of a large group of consumers for the purpose of testing products must be made with considerable care. For instance, well-to-do classes are apt to be more accustomed to perceiving delicate and varied flavors, aromas and colors. Poor people are likely to be at the opposite extreme, while the middle economic strata of consumers may provide more dependable results. Here again, there is the qualification that the product itself may be designed to sell to a wealthy group, a middle group or a poor group. Tests show that age may also have marked effects. For dependable conclusions, therefore, it may be desirable to select testers at random from among groups destined eventually to exert their preference over the retail counter for products possessing certain characteristics.

When home use is necessary, as in testing cooking fat, salad dressing, canned soup or beans, soap, cleanser or water softener, it is preferable to make arrangements in some way other than by ringing door bells. The officers of a women's organization may sponsor the test in a preliminary announcement to members, and, with a minimum of wasted effort, the investigator may call at the homes to deliver the product and explain the required procedure. Usually compensation for making the product comparisons is unnecessary, beyond a free supply of the products being studied. The Kroger Food Foundation gives a Christmas gift to its numerous home testers in many cities. However, a small donation to the treasury of a women's organization, proportionate to the number of members completing a test, will often cause nearly a 100 percent response within a specified time. When comparisons of an extensive nature are necessary, such as in cooking and baking, a small gift to each home may be advisable for obtaining good will and maximum results. It is worth noting that, in home tests, it is possible to obtain the opinion either of the family as a unit or of individual members—men as well as women, and children as well as grown-ups.

If use in the home is not important and the questions concern the taste, aroma, appearance and sound of finished products, results may often be obtained more promptly by arranging for comparisons at meetings. For example, two foods may be compared at a woman's luncheon. When a manufacturing plant is open to public inspection, it is even more expeditious to ask visitors to pass judgment on products. As a creator of good will, such tests are impressive evidence of a company's desire to make its products according to the public preference.

Testing by Mail

When it is necessary to collect information by mail, elaborate instructions are often required in order that the conditions under which the tests are conducted may be uniform. For instance, in testing salad dressing, it is necessary that the product be used in the same way or ways in every instance such as on lettuce or in sandwiches. These instructions must be clear and must be accompanied by a letter stating the purpose

* Threshold of taste is the smallest concentration of a substance that the particular individual can detect. Individuals—not substances—possess thresholds. But the threshold for one substance may differ from that of another.—Editor.

Plant employees sampling pickles to determine the consumer's preference. In this instance the preferences of 200 people were determined, giving a good index. This method of testing, however, does not go quite as far as that which extends to the consumer's table.

and arousing the interest of each tester to the point of willingness to cooperate. Such difficulties are not as troublesome when it is possible to test the product in group meetings because verbal instructions may be given effectively and supervision may be exercised.

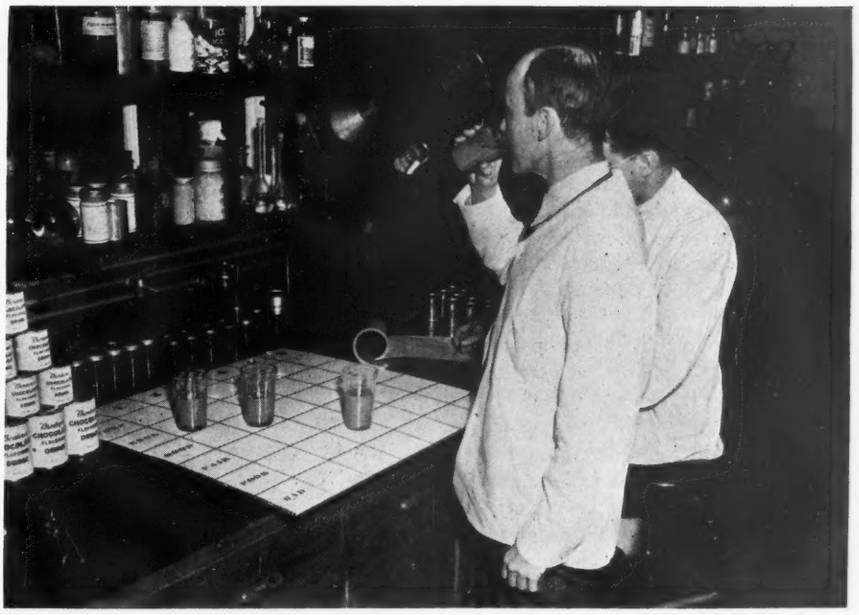
The experience of General Foods Corp. and others seems to indicate that the repeated seeking of opinions about radio programs, advertising themes and product characteristics from the same consumer juries tends to develop a professional attitude in some individuals and a careless, irritable or noncooperative mood in others. As a precaution against this, comparisons should not be requested too frequently and new groups of consumers should be brought into each test. Spontaneous reactions of amateurs reflect market preferences more accurately.

One fundamental principle in all of these tests is that of comparison. When one product is used and the simple question is asked, "Do you like it?" the easiest, most courteous answer is "Yes." If, however, a comparison with some other product is expressed or implied, more accurate results will be forthcoming.

Better judgment as to which of two products is preferred may be obtained by asking the following three direct questions: (1) In your opinion, is there a difference between these products? (2) If so, which one do you prefer? (3) Why?

The first question restrains the tendency to search for minute points of contrast and gives an opportunity to indicate the lack of a significant difference. The second question brings out the general preference. The third invites the tester to give reasons for his choice, and in doing this he records both his favorable and unfavorable impressions. By tabulating these for all voters, the relative importance assigned by voters to the various product characteristics may be determined.

For dependable results, it is important that each tester make his choice independently of others and without being influenced by them in any way. It sometimes happens that when products are being compared by a group of people, one outspoken tester may influence the decisions of others and invalidate the results by calling out, "I like Number One. Doesn't it have a lovely color!" In order to avoid this possibility, it is often advisable to shuffle the sample numbers in such a manner as to make it practically impossible for different testers to compare their impressions. The samples of product No. 2 given to different testers may be designated by such numbers as 248, 862, 962, 724, 426, etc., the numeral 2 being common to each. Similarly, No. 3 may be designated as 763, 376, 384, 399, 436, 493, etc. This method is most effective when products are similar in appearance.



Making a taste test with the aid of a score board for rating the samples "Perfect," "Excellent," "Good," "Fair," "Poor" and "Bad."

Other circumstances may also give rise to biased results. In describing how to make a test before a group, an enthusiastic member of a sales or production department is apt to announce: "This sample is made according to our new formula." The trained research man will endeavor to avoid any statement or occurrence which will help testers to identify one product in comparison with another and to avoid a situation in which the tester feels impelled to reward progressiveness by voting for a new product.

The major result of a test may take the form of such a statement as follows: "Out of 313 testers, 62 percent preferred product No. 1, 36 percent preferred product No. 2, and 2 percent could see no difference." As a reflection of consumer opinion, the reliability of this result depends upon several factors. If the preferences for a product vary between different sections of a market, the testers should adequately represent these sections. Middle class groups of testers, while more earnest and discriminating in making comparisons than either low or high income groups, may not always reflect the latter's preferences. In this connection, the degree to which a product is universally used is important.

Again, the size of sample necessary for stable results depends on the contrasts in the products' characteristics and on the number of testers. Reactions will be more reliable if the products' characteristics are very noticeable. When a fine distinction in taste, color, smell, sound or touch is being examined, results should be based on a larger number of people. Hence, the chance of a similar group of testers giving different results rests on the difference between the percentages of testers favoring the two products and the number of comparisons made. In the previous example, the chances are 100 to 1 that the real advantage of product No. 1 over product No. 2 is at least 8 percent. Many a business concern would be glad to know that, according to the judgment of customers, its product had a superiority over a competitive product of at least 8 percent and probably more nearly 25 percent.

When a product's superiority is less pronounced it is necessary, of course, to base conclusions on a great many more tests. On the other hand, the required number of tests may be much reduced when a manufacturer is willing to risk a greater error in results, such as a 1 to 10 instead of a 1 to 100 chance. From this, it follows that the number of testers required for acceptable results may be approximated by using the results of preliminary tests to estimate the probable superiority of one product over another, and by deciding upon the permissible error in advance.

Consistency of Results Important

It is always worthwhile to pay attention to the consistency of the results from successive tests as they are made, because they comprise the components of the final results. Repeated tests should be made with new groups until the accumulated results are stable. Consistency may also be judged in more elaborate tests by

logical relationships. Suppose that, in order named, products *A*, *B* and *C* differ only in sweetness. If tests show product *B* is regarded as better than *A*, and *C* is preferred to *B*, then *C* should logically be better than *A* and a consumer comparison of *C* and *A* should turn out this way. On the other hand, when the three products represent different combinations of sweetness and other characteristics, it may be quite logical for *A* to be preferred to *C*.

Consistency from time to time also is important. For example, the repetition of comparisons in two products two years apart have led to the same conclusions, although consumer groups were different in the repeated experiments. Of course, when months or years intervene between tests, caution is necessary in order to distinguish inconsistency from more or less rapid changes taking place in consumer preferences, such as the recent shift from mayonnaise to salad dressing or recurring cycles in clothing styles.

How to Spot Guesses

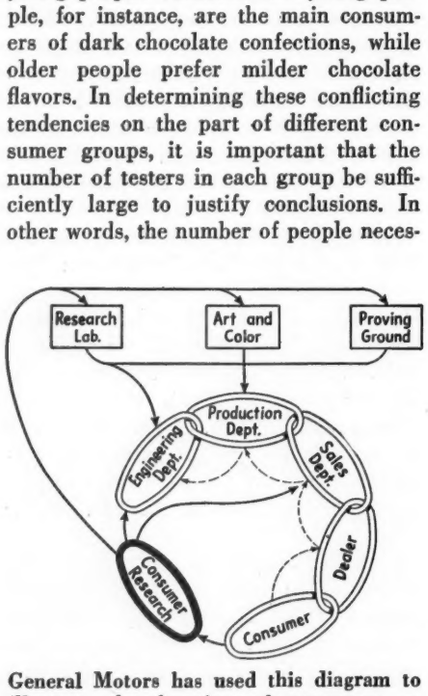
Sometimes it is desirable to determine the proportion of the testers who imagine differences to exist between products. This may be done by supplying a limited group of people with two samples of the same product and asking them the same questions put to testers in comparing two different products. The percentage who imagine a difference may be used to interpret the results of the main tests. In one instance, 30 percent could not distinguish between identical samples, while only 5 percent could find no point of distinction between different samples.

The analysis of the reasons given for preferring one product instead of another is one of the most fruitful sources of knowledge regarding consumptive habits and trends, especially when jointly coupled with supplementary information. For example, it was determined several years ago that an ideal salad dressing should possess the following characteristics:

1. Fresh appetizing aroma, without oily smell.
2. Rich and creamy appearance, but not too yellow or glossy.
3. A heavy consistency, rather than thinness.
4. An appetizing flavor, perfectly blended.
5. Tastiness and slight tartness without being over-tart or over-spicy.
6. Add zest to vegetable salad and blend with fruit.

In such analyses it is important to rank the characteristics of products in accordance with their appeals to the different senses. As an illustration, nut butter possessing a smooth, nongranular texture, in which the component oils and solids do not separate, appeals to the senses of touch and sight because of softness and spreading qualities. On the other hand, coarse nut granules in some makes of nut butter tend to separate from the oils, and settle to the bottom, but when the granules are crushed by the teeth a stronger nut flavor is tasted. For a majority of people stronger flavor is preferred to smoothness, but the large minority favoring the latter provides a substantial market for the easy-spreading, milder type, especially when the competitive situation is considered. Similarly, the appeal of tenderness in ham is greater than the appeal of flavor when a choice must be made or when flavor must be sacrificed in order to provide tenderness; but the ham which provides both tenderness and flavor is indeed fortunate in its appeal to the senses of both touch and taste.

Valuable information may be derived by classifying preferences and supporting reasons according to the age, sex and other characteristics of testers. This has revealed a general tendency for the present generation to prefer mild, delicate flavors in foods, similar to the tendencies in clothing styles. On the other hand, there seems to be a pronounced difference in the taste preferences of old and young people. Children and young people, for instance, are the main consumers of dark chocolate confections, while older people prefer milder chocolate flavors. In determining these conflicting tendencies on the part of different consumer groups, it is important that the number of testers in each group be sufficiently large to justify conclusions. In other words, the number of people necessary to establish a difference in preference on account of age must be as large for each age group as would be necessary to establish a general preference. As a consequence, the establishment of contrasting group preferences is more expensive but may be justified under particular circumstances.



General Motors has used this diagram to illustrate the function of consumer research. The company believes there is a need for some kind of liaison to substitute for the close personal contact between manufacturer and consumer in the days of the small shop. Consumer research aims to fill this need by providing a more direct line of communication between producer and consumer.

Many other illustrations of the value of these tests in the different aspects of sales planning and promotion might be given. Following is a summary of the major uses for the information gained:

1. To improve the products in accordance with market preferences.
2. To keep abreast of changing preferences.
3. To add the "frills" to a product which consumers want and to eliminate and avoid those which are inessential or "not worth the money."
4. To supply selling arguments for the sales organization to use.
5. To determine how far economy in ingredients may be practiced while maintaining or increasing the consumer preference for the product.
6. To find the most effective advertising appeals regarding the product's qualities.
7. To direct effort toward special groups of buyers.
8. To determine how much of the trade preference for a particular product is inherent quality and how much is due to past and present selling effort, thus obtaining a clue to the amount of advertising and selling necessary for promotion of a new product.
9. To give new confidence to the selling organization through proof of product superiority.
10. To avoid lavish selling and advertising expense in a futile effort to promote sales when the product's characteristics are at fault.
11. To aid in pricing a product in accordance with the possibilities of preference for it, rather than in accordance with cost of production.
12. To aid in devising packages having both practical and aesthetic appeals.

In most instances the expense involved is small. The chief limiting factor is competent research help to conduct the various analyses in such a manner as to provide the largest amount of dependable information. The degree to which this need is met influences the results tremendously. Although it is impossible to estimate the monetary value of market analysis for product control with any degree of accuracy, improvements resulting from it may increase volume and prices and reduce selling expenses over a long period. In short, it can be the determining factor in a company's ultimate success or failure.

Do Consumers Have Good Taste?

By C. L. ARNOLD, *Director, Kroger Food Foundation, Cincinnati, Ohio.*

A LARGE and well-balanced advisory committee of housewives is one of the most interesting tools available in consumer research. The remarks which follow are based on close personal experience with a committee of 750 women scattered throughout 18 middle western states.

Any inclination for us to doubt the ability of the consumer (as represented by this group) to express preferences and the reasons therefor has long since ceased. We know now that the fault is ours if in our final analysis we fail to properly evaluate test results.

Every test requires individual consideration of the specific product and problem each step of the way. Every one is a case unto itself. Throughout the preparation, performance, tabulation and analysis of each test, many details must be observed.

Interpretation of the results must be in conjunction with sales records, laboratory reports and all other available facts. Following some tests, additional laboratory data will be found necessary. Following others, interviewers will be sent out with more test samples to explore further thinking or added details indicated by the tabulation.

A great deal of doubt has been expressed about taste tests. While some of it is just, the critics may be like our friends who say they cannot use electric razors—which *also* require patience, understanding and repetitive effort!

As a matter of fact, actual tests indicate that we may not give the consumer enough credit for taste intelligence, especially when she disagrees with us! Certainly all testers are not equally discriminating and some may do no more than make a guess. This and other negative factors must be offset by attention to numerous details, some of which may here be mentioned briefly:

a. Continuous effort to maintain a balanced group.

C. L. ARNOLD

b. The use of a sufficient number of testers to level out peaks of prejudice or valleys of opinion.

c. Careful preparation and pretesting of the questionnaire so that supplementary questions will reveal the accuracy of the main replies.

d. For taste testing, the highest and lowest income groups may be omitted. These people all have fairly normal taste reactions, but the wealthy lack genuine interest and many of the poor lack the ability to fill out intelligent questionnaires.

e. The committee operates in their homes under normal conditions. This avoids spot tests which force an immediate and perhaps too hasty decision, and it likewise forestalls the collaboration or influence of vote so frequently observed when testing is done in groups or *en masse.*

Critics question tests where the strong taste of one sample is checked against a milder flavored item. Our diversity of experience seems to disprove this. In some cases, people want to taste what they taste! In products containing fruit flavoring, for example, the majority of people reject flavor fidelity and choose flavor strength. *Per contra,* people reject soups having the stronger genuine flavors of the products whose names they bear and choose products containing the mildly blended flavors of "sugar and spice and everything nice."

And now for some concrete examples of actual tests.

To determine consumer reaction to variation of color in a certain canned fruit, committee members were sent the two types then being used under the same label.

Ninety-six percent of the replies accurately designated the darker of the two samples. Of those who correctly answered the first question, 48 percent stated the difference was great, 44 percent stated the difference was small and 8 percent stated the difference was negligible.

A further breakdown for color preference is shown in Table I.

The darker sample received a slight preference over the lighter all the way through, with "no choices" increasing in each group as the opinion of degree-difference in color lessened.

In answering a final question covering flavor preference exclusively, well over half of each group showed a definite preference for the darker product. Knowing that this darker product represented a somewhat greater degree of ripeness, a quite logical reason for the committee's choice on flavor, the subsequent decision to purchase only the darker colored product for the label automatically eliminated the color variation which had been the basic subject of discussion.

At times it has been of interest and value to determine the degree of ability to detect differences in flavor. In Table II one-third of the committee compared products having sirups at two levels of sweetness corresponding to 19 and 21 deg. Brix, a second third compared products with sirups at 21 and 23 deg. Brix,

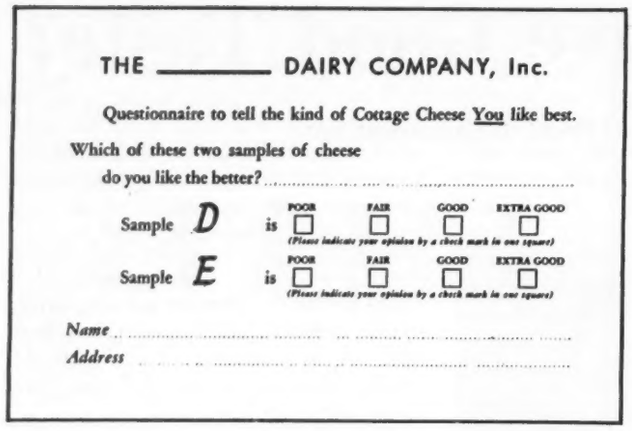
Table I—Test 56

Sample preferred	Those voting great difference in shading	Those voting slight difference in shading	Those voting negligible difference in shading
Darker	43%	37%	35%
Lighter	41%	30%	14%
No preference	16%	33%	51%
Percent objecting to both kinds interchangeably under same label	52%	20%	10%

Table II—Test 73

	19° Brix	21° Brix	N.P.*	21° Brix	23° Brix	N.P.*	19° Brix	23° Brix	N.P.*
Considering all factors, sample preferred	26%	55%	19%	28%	52%	20%	19%	70%	11%
Flavor pref.	32%	49%	19%	30%	54%	16%	18%	73%	9%
Reasons for pref. sweeter	8%	32%	....	21%	26%	....	8%	24%	....
More tart	27%	14%	....	13%	14%	....	29%	9%	....

* No preference.



THE _____ DAIRY COMPANY, Inc.

Questionnaire to tell the kind of Cottage Cheese You like best.

Which of these two samples of cheese do you like the better?.....

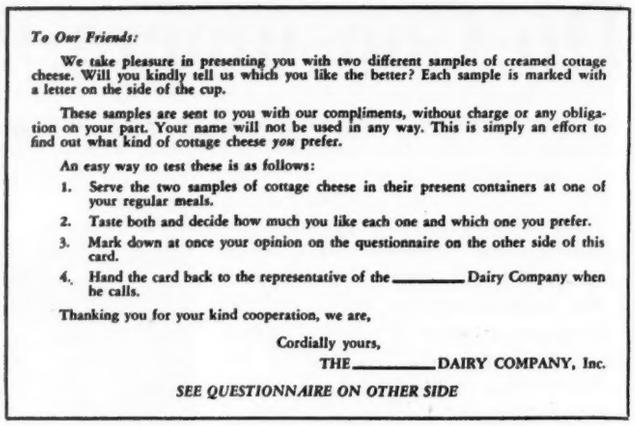
Sample D is ☐ POOR ☐ FAIR ☐ GOOD ☐ EXTRA GOOD
(Please indicate your opinion by a check mark in one square)

Sample E is ☐ POOR ☐ FAIR ☐ GOOD ☐ EXTRA GOOD
(Please indicate your opinion by a check mark in one square)

Name .....

Address .....

Handy form of score card for use when products are sent out to consumers to determine their opinions. (See article by Platt, "Food Industries," January, 1937, page 7.)



To Our Friends:

We take pleasure in presenting you with two different samples of creamed cottage cheese. Will you kindly tell us which you like the better? Each sample is marked with a letter on the side of the cup.

These samples are sent to you with our compliments, without charge or any obligation on your part. Your name will not be used in any way. This is simply an effort to find out what kind of cottage cheese *you* prefer.

An easy way to test these is as follows:

1. Serve the two samples of cottage cheese in their present containers at one of your regular meals.
2. Taste both and decide how much you like each one and which one you prefer.
3. Mark down at once your opinion on the questionnaire on the other side of this card.
4. Hand the card back to the representative of the _____ Dairy Company when he calls.

Thanking you for your kind cooperation, we are,

Cordially yours,
THE _____ DAIRY COMPANY, Inc.

SEE QUESTIONNAIRE ON OTHER SIDE

Reverse side of score card at left, showing instructions to consumers taking part in the test. The message on the card also serves to build good will among consumers.

while the remaining third compared the 19 and 23 deg. products.

Note that the ability of the first two groups to detect two degrees Brix difference in sweetness was about uniform, but that ability to differentiate rose tremendously when the spread increased to four degrees, while the flavor preference increased also. Moreover, the flavor preference for the sweeter product was slightly higher in the second and sweeter group, although the ability to accurately designate the sweeter of the two samples was less than in either of the other two groups.

The technic of testing the consumer on a comparison of two products rather than an inspection of one is, perhaps, a matter of opinion or argument. Some of my associates occasionally chafe at the requirements for comparative tests.

"You know very well," say they, "that if we were to submit that product alone, it would receive a favorable vote."

"I am sure it would," we reply, "but if we insist that our products must earn a definite majority in taste tests against other known products—if our products will stand this acid test—then we can have that much more confidence in them. And besides, it is the only way we can be sure the testers are free of bias in their reporting."

Of course, it does place a greater burdent on a development laboratory, but it likewise insures the thoroughness that should be expected in product development.

Occasionally (but as seldom as possible), we do carry out a single product test. One such instance was canned potato salad. The principal product then on the market was not suitable for comparison and, moreover, the proposed item had home-made potato salad as its chief competitor.

In our first test, therefore, we sent out a single package with this questionnaire:

Table III—Bread Interviews

	Brand MX	Brand ZT	No preference
1. Two samples left same day; recall made second day.....	37.5%	49%	3.5%
2. First sample left; recall 2nd day and second sample left; recall on 4th day*.....	320 points	325 points	
3. Two samples left on separate days; single recall.....	37.2%	40.3%	22.5%
4. Two samples given and preference recorded on the spot...	47.6%	48.4%	4.0%

* Platt method of rating "poor," "fair," "good," "extra good."

Please vote on the characteristics of the sample as follows:

1. Color: too creamy? —— too pale? —— satisfactory? ——
2. Consistency: satisfactory? —— too dry? —— too moist? ——
3. Tartness: too tart? —— not tart enough? —— satisfactory? ——
4. Salt: lacking salt? —— satisfactory? —— too salty? ——
5. Sweetness: properly sweet? —— too sweet? —— not sweet enough? ——
6. Cut of potatoes: too coarse? —— too small? —— satisfactory? ——
7. Potatoes: mashed too much? —— too hard or firm? —— sufficiently individual? ——

Careful analysis of replies revealed the strong and weak points in the original formula. After further laboratory effort, an improved product (we hoped) was effected and again a single sample was sent out. Here we repeated the seven-part question asked in the first test, with one additional query:

In your opinion do you feel this product:

1. Is in suitable form for sale? ——
2. Requires further development? ——

Would you rate this sample Good? —— Fair? —— Poor? —— Excellent? ——

After this came further laboratory effort on the product and repetition of the identical test. Once again, the votes and the criticisms, and still another test. Even we who had developed confidence in the committee were somewhat startled to see the steady ratio of improvement. Sixty-five percent of the women stated that the product was in suitable form for sale the first time we asked this question, 77 percent the second time, and 83 percent the third time!

Even making a liberal allowance for the lack of direct sample comparison, as well as for the tendency to be complimentary in a single product test, the series gave eloquent evidence of committee consistency and dependability.

However, this dependability can never be taken for granted, no matter how elated we are when it is evidenced. That is where the occasional use of interviewers provides supplementary aid. In addition to this supplementary work, interviewers are exclusively used on certain studies, particularly where perishable items are involved.

Bread probably represents one of the most difficult subjects for test, and it may be of interest to examine Table III, comparing four different examples of the interview method applied to this food product.

In the first method, both samples were left at the same time in plain wrappers properly coded and the votes secured by an interviewer two days later.

In the second, one sample was left, and on the second day following, an interviewer secured a ballot rating the product, at which time a second sample was left. On the fourth day the interviewer returned and secured a ballot rating on the second sample. In these ballots the housewife rated each loaf "poor," "fair," "good" and "extra good," and the points were given a numerical evaluation. Our interest in and occasional use of this method stems from an

article in FOOD INDUSTRIES in 1937 by Washington Platt.

In the third test, one sample was left one day and another on the second day following, and on the fourth day a single recall was used to secure a voting preference on the two samples. This method, of course, puts a great deal of reliance on the memory of the witness, as indicated by the unusually high percentage of "no preference" votes.

In the fourth test, both samples were given to the housewife for immediate testing, and her preference was recorded on the spot. The obvious disadvantage of a spot test, particularly on a product such as bread, is well evidenced in the results, which show a much lower preference for brands than did any of the other methods.

Our primary purpose was to learn whether a product as difficult as bread could respond to taste-preference tests with consistent results. Either of the first three methods may be termed satisfactory. The first will provide a more definite results because it involves the most direct comparison.

If either our remarks or our examples optimistically infer that we have complete confidence in the ability of the consumer to taste anything and everything accurately and report upon it reliably, we have overstated our case. We do feel, however, that we have found formulae which utilize the consumer in an effective and constructive manner to secure results that are intellible as long as we are intelligent in handling them.

A Method of Consumer Product Testing

By J. L. BOGERT, *Benton & Bowles, Inc., New York, N. Y.*

THIS product-testing technic was originally developed in 1932 and has since been used to measure and point out ways of improving the competitive product position of a large number of mass-market household items. It has been used successfully for testing breads, coffees, teas, breakfast cereals, cocoa, shortenings and many other food products.

It was designed specifically to answer the following questions:

1. How does the tested product compare in general with competing products in satisfying the desires of the largest number of consumers?

2. In what qualities or attributes has the tested product an advantage or disadvantage in relation to competing items?

To obtain valid answers to these questions, the method had to meet the following requirements:

A. The group testing should be a representative sample of the market for the test product.

B. The testing group should be large enough to give significant statistical results.

C. The products should be tested in "blind" form to avoid the influence of factors not pertinent to the problem.

D. The method of testing should closely approximate normal use.

E. The results of the test should show:

(a) How test product compares with standard in general preference.

(b) In what ways the test product should be modified to improve its competitive position.

J. L. BOGERT

To carry on product tests which would meet these conditions, a panel group of 3,500 families was established. These families were selected by mail to include adequate representation of the various regional, community, racial, economic and occupational groups which make up the national population.

A record is kept of the occupational, racial and economic status of each member so that individual panels may be formed from the group to match the market characteristics of products tested.

Products are usually tested in single pairs—multiple comparisons are not advisable except in special cases. If it is desired to test a product simultaneously against more than one competing brand, separate groups of testers are used for each pair.

When products are sent to the jury for testing, care is taken to avoid identification with any known brand to avoid any bias due to the influence of name, advertising, price, and so forth. Hence, the products are packed in identical containers which differ in appearance only in the identifying code used by the tester for recording the results of the comparison. Numerals, colors or terminal initials are not used for the codes.

Tests, as far as possible, approximate normal conditions of use. The jury is instructed to use the test products in their regular way, which usually calls for alternate use with a normal time interval between the use of each, the alternate use being repeated as often as desirable.

This is done because a coincidental comparison may introduce an artificial condition and distort the results, particularly on such qualities as taste or flavor, odor, and so forth. Experience has shown that alternate normal use, even when separated by several days, provides sensitive comparisons in the group and results in accurate expressions of opinion.

Questionnairing Technic

To get the answer to the first part of the problem, general preference, only a simple question is needed such as: "All things considered, which do you prefer?"

To obtain the answer to the second—reasons for general preference—is more difficult and requires a more complicated technic. It is necessary here to get opinions on various qualities which are frequently difficult for the consumer to iso-

late. To do this the problem is attacked in three ways:

1. Votes are requested on a list of individual qualities which are known to be of importance.

2. Voluntary reasons why one product is preferred to the other are requested.

3. The jury is asked to record the things liked and disliked about each product.

A typical letter of instructions and a questionnaire as might be used for a test of two ready-to-eat food products of the same type are on this page.

Interpretation of Results

The following results might be shown from the analysis of a hypothetical test of 500 comparisons of two ready-to-eat food products using the accompanying questionnaire.

The general preference votes of the housewives are recorded in answer to question 3: "All things considered, which would you prefer to serve most often if both sold at the same price?"

Preferred product *P* 256
Preferred product *M* 150
No preference 94

Total ..... 500 Ratio $\frac{P}{M} = 1.54$

For reasons explained later, it is convenient to show the results of these and other votes as simple ratios. In these ratios the votes for either product may be related to the other (*i.e.*, the votes for *P* may be expressed as a ratio to *M* or vice versa). But the ratios should be calculated in the same manner throughout the test.

"No preference" votes should be distributed equally between the two products. Hence, in the above example, the general preference ratio of product *P* to product *M* is 303 to 197 or 1.54.

Significance of the Difference

In the group testing, a substantial majority preferred product *P*. Can we reason from this that *P* would be preferred over *M* if the entire market had tested the two products? How much probability is there that the margin in favor of *P* was due to the chance response from the group rather than any real difference in preference between the products? This is a problem in probability similar to calculating the chances that a coin tossed 500 times will fall heads 106 times more often than tails. The calculated odds are several thousand to one against the occurrence of such a difference.

Another way of indicating the significance is to record the vote ratios for succeeding groups of questionnaires as received to determine whether the ratios are stabilizing:

	Individual ratio	Accumulated ratio	Deviation
1st 50 (Total 50)....	1.49	1.94	+0.40
2nd 50 (Total 100)...	0.85	1.27	−0.27
3rd 50 (Total 150)....	3.17	1.68	+0.14
4th 50 (Total 200)...	0.85	1.41	−0.13
5th 50 (Total 250)....	1.17	1.36	−0.18
6th 50 (Total 300)....	2.34	1.48	−0.06
7th 50 (Total 350)...	2.57	1.59	+0.05
8th 50 (Total 400)...	1.38	1.57	+0.03
9th 50 (Total 450)...	1.17	1.52	−0.02
10th 50 (Total 500)....	1.78	1.54	.....

This tabulation of successive groups of 50 questionnaires shows that while there is considerable variation in the prefer-

---

Dear Research Corps Member:

With this letter are two packages of new ready-to-eat food products. We wish to find out which of these two you and your family prefer and why.

Instructions for Making the Test

The first thing to do is to look at the two products before you serve them and answer No. 1 on the questionnaire. Then, do not answer any of the other questions until you have served your family the two test products for six days. During this time please do not serve any other brands.

Serve these two products alternately—that is, serve *M* for three days every other day and *P* the other three days. Suppose you start serving *M* the first day, you would then serve *P* the second day, *M* the third day and *P* the fourth, etc. At the end of the sixth day fill out all the other questions on the questionnaire.

In voting for the individual qualities in questions No. 1 and No. 2, please give your own personal opinion as to which is better for each quality. For example, if you like the flavor of one better than the other, put a check mark under the product you prefer for flavor and vote on each other quality the same way. If you can notice no difference, put a check mark in the "No preference" column.

In answering questions No. 5 and No. 6, please be perfectly free in telling us what you like or dislike about each.

In answering question No. 7, please list the other members of the family who ate the test products, giving their relationship and, in the case of children, their ages. For example, if your husband ate both of them, write "husband" on the first line and check the one he preferred. If a child, write "son" or "daughter" and the child's age. Use one space for each member of the family who tried the products.

After you have completed the test and filled out the questionnaire, please mail it as soon as possible in the attached envelope which requires no postage.

Very truly yours,

Questionnaire—Test of Two New Food Products

Before serving the two new food products please pour out a small amount of each in two saucers and compare them from the standpoint of appearance. Then answer the following by placing a check mark (√) under *M*, *P*, or "No Preference."

1. Which of the two products do you think:	*M*	*P*	No Preference
Had the better color	☐	☐	☐
Had the better odor	☐	☐	☐
Looked more appetizing to you	☐	☐	☐

After serving each product every other day for 6 days, please note with a check mark which you personally preferred for each of the qualities listed:

2. Which of the two food products do you think:	*M*	*P*	No Preference
Had the better taste or flavor	☐	☐	☐
Had the better size of particle	☐	☐	☐
Was tenderer	☐	☐	☐
Was more uniform	☐	☐	☐
Was crisper	☐	☐	☐

3. All things considered, which product would you prefer to serve most often if both sold at the same price?— *M* ☐ *P* ☐ No Preference ☐

4. If you preferred one what are the principal reasons for your choice?.....

5. Name the things you *liked* about *M*.....

Name the things you *disliked* about *M*.....

6. Name the things you *liked* about *P*.....

Name the things you *disliked* about *P*.....

7. Which of the two products did the other members of the family prefer?

Other Members of the Family: (Husband, sons, daughters, etc. Please give age of children)	*M*	*P*	No Preference
.....	☐	☐	☐
.....	☐	☐	☐
.....	☐	☐	☐
.....	☐	☐	☐
.....	☐	☐	☐

8. On what days did you serve each of the test products?

Product	*Dates Served During The Test:*			
M	.....	.....	.....	.....
P	.....	.....	.....	.....

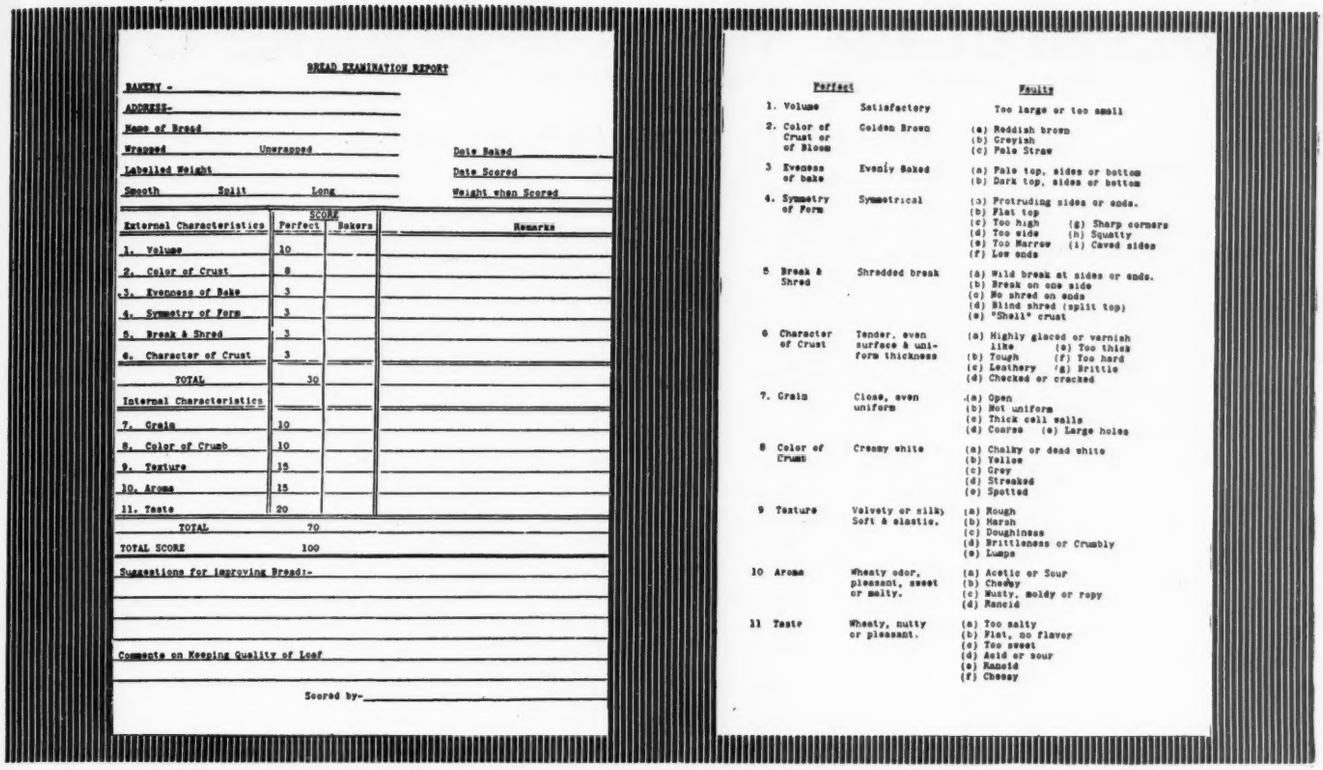
9. What brands of these products do you serve most regularly in your home?

....

....

Name..... Date.....

Street..... City.....



BREAD EXAMINATION REPORT

BAKERY -

ADDRESS-

Name of Bread

Wrapped Unwrapped Date Baked

Labelled Weight Date Scored

Smooth Split Long Weight when Scored

External Characteristics	SCORE Perfect	Bakers	Remarks
1. Volume	10		
2. Color of Crust	8		
3. Evenness of Bake	3		
4. Symmetry of Form	3		
5. Break & Shred	3		
6. Character of Crust	3		
TOTAL	30		
Internal Characteristics			
7. Grain	10		
8. Color of Crumb	10		
9. Texture	15		
10. Aroma	15		
11. Taste	20		
TOTAL	70		
TOTAL SCORE	100		

Suggestions for Improving Bread:-

Comments on Keeping Quality of Loaf

Scored by-

	Perfect	Faulty
1. Volume	Satisfactory	Too large or too small
2. Color of Crust or of Bloom	Golden Brown	(a) Reddish brown (b) Greyish (c) Pale Straw
3 Evenness of bake	Evenly Baked	(a) Pale top, sides or bottom (b) Dark top, sides or bottom
4. Symmetry of Form	Symmetrical	(a) Protruding sides or ends. (b) Flat top (c) Too high (g) Sharp corners (d) Too wide (h) Squatty (e) Too Narrow (i) Caved sides (f) Low ends
5 Break & Shred	Shredded break	(a) Wild break at sides or ends. (b) Break on one side (c) No shred on ends (d) Blind shred (split top) (e) "Shell" crust
6 Character of Crust	Tender, even surface & uniform thickness	(a) Highly glazed or varnish like (e) Too thick (b) Tough (f) Too hard (c) Leathery (g) Brittle (d) Checked or cracked
7. Grain	Close, even uniform	(a) Open (b) Not uniform (c) Thick cell walls (d) Coarse (e) Large holes
8 Color of Crumb	Creamy white	(a) Chalky or dead white (b) Yellow (c) Grey (d) Streaked (e) Spotted
9 Texture	Velvety or silky Soft & elastic.	(a) Rough (b) Harsh (c) Doughiness (d) Brittleness or Crumbly (e) Lumps
10 Aroma	Wheaty odor, pleasant, sweet or malty.	(a) Acetic or Sour (b) Cheesy (c) Musty, moldy or ropy (d) Rancid
11 Taste	Wheaty, nutty or pleasant.	(a) Too salty (b) Flat, no flavor (c) Too sweet (d) Acid or sour (e) Rancid (f) Cheesy

One type of score card used in determining consumer opinions of bread. The front of the card is shown on the left, the reverse on the right. (See article by Platt, "Food Industries," March, 1931, page 108.)

ence ratios of individual groups, the ratios of the accumulated totals tend to stabilize around 1.54 after 300 questionnaires have been received with little deviation beyond that number.

In view of this fact and the long odds against the difference being due to chance, we are safe in concluding that product *P* has a substantial general product advantage over product *B*, thus answering the first of our problems.

The next step is to find out the reason for this product advantage.

Questions 1 and 2 on the questionnaire call for votes on a selected list of qualities. These votes are recorded and ratios calculated for each as shown in the following table:

	Product P	Product M	No pref.	Ratio P/M
Better color	307	117	76	2.23
Better taste or flavor	310	140	50	2.03
Crisper	259	121	120	1.77
More appetizing appearance	273	147	80	1.68
General preference	256	150	94	1.54
Tenderer	229	129	142	1.50
More uniform	240	168	92	1.34
Better size of particles	217	169	114	1.21
Better odor	214	204	82	1.04

An examination of the ratios for individual qualities in relation to the "general preference" shows that color, flavor and crispness rank ahead of the "general preference," while odor, size of particle and uniformity rank below it. This indicates that the advantage of product *P* over product *M* lies largely in color, taste and crispness, and in the qualities of odor, size of particle and uniformity product *M* probably has an advantage over product *P*.

For further light on this point, the answers to questions 4, 5 and 6 are tabulated, and these indicate the importance of the individual qualities in determining the "general preference" vote.

Question 7, which gives the "general preference" of other members of the family, is tabulated in the same manner.

If the group testing is sufficiently large to provide an adequate sample, the results may be analyzed by economic class and various other subdivisions.

The first difficulty of interpreting a product test is how to differentiate between definite choices and mere guesses on the part of individual testers. In the method described this not a real difficulty since we are dealing with groups rather than separate individuals. It is obvious that if all the members of the jury voted by guess, on the basis of pure chance, the votes for the two products would be equal within the limits of the probable error due to the size of the sample. In other words, if the testers have no definite opinion about the merits of the products they are testing, the results of the test will never show significant differences. On the other hand, if differences are observed greater than may be accounted for by reasonable probability, then such differences are due to some factor inherent in the products tested. The nearer two test products approach each other in acceptability and the more alike they are, the fewer will be the clear-cut choices of the individual members of the group and the smaller will be the observed difference between the two products.

The second difficulty pointed out is the effect in the test of dominant qualities, such as flavor, distorting a true comparison between the two products. It is for this reason that in the method described the products are generally tested under normal conditions of use. We are satisfied that in most cases the true opinion is more accurately obtained by the alternate normal use of two test products than by a coincidental comparison.

The third difficulty refers to the effect of continued use of a product on its acceptability. This is, course, a special problem which the described tests do not necessarily solve. It is, however, possible through the method to measure the conditioning effect of continued use by making the test among special groups who have used the test product or one with the same characteristics regularly over a period of time. This special group may be conditioned deliberately or it may be selected from the panel on the basis of the brand and type of product regularly used in the home. Tests of this type have been successfully made to show not only how acceptable the product is initially but whether or not this acceptability varies with continued use.

Interpreting What We Find Out

By WASHINGTON PLATT, *The Borden Co., Syracuse, N. Y.*

IN a previous article on "Evaluation of Consumer Preference Tests," I outlined some of our experience with such tests. The form of score card there described is shown elsewhere in this symposium. This has continued to give satisfaction.

In evaluating results with this card, numerical values are given to the different ratings as follows:

Poor	= 0	Good	= 2
Fair	= 1	Extra Good	= 3

By multiplying the number of votes under each heading by the above factors, it is possible to obtain a figure for the total vote on each sample submitted.

In order to overcome the difficulty arising from the strong flavor of one sample predominating over the more delicate flavor of another, we have resorted to the method of sending out samples one at a time, asking for a score and comments on the single sample submitted. The scores on each sample submitted alone were then averaged. This method gives the advantage of obtaining a judgment on a single sample. After all, it is unnatural for a consumer to have before him two samples of the same food—for example, two different cups of coffee. Results from this method offer a helpful check on the method whereby two samples are submitted for comparison. We believe that this is distinctly worth while.

Other methods for overcoming this difficulty are described by Arnold and Bogert in the present symposium.

Dr. Cowan's article describes one method for the estimation of the number of guesses in decisions made between food products. Another method is to submit the same two samples to the same group twice, but under different labeling. The number of *guesses* is twice the number who reverse themselves. This is more fully described in a previous article.

Testing a Food in Daily Use

One of the most difficult problems is that regarding the preference for a food which is intended for daily use over a long period. Obviously, one test must consist of supplying to consumers for periods of several weeks the sample which has been tentatively selected, to see if it really "wears well;" that is, whether they readily tire of it. Only one sample can be submitted to a given consumer at a time. However, different samples can be submitted to different groups over a period of several weeks and their comments compared in order to obtain an idea of relative preference.

Another solution to this problem consists of voluntary consumption tests of different samples by different groups in an institution. This method is ideally suited to such a product as bread. It is described by Bailey in the reference given below. Other suggestions regarding this problem are touched on in Bogert's contribution to this symposium.

The planning, execution and interpretation of results from a consumer preference test for food products always presents a problem. Every test must conform to the basic considerations given in the introductory remarks. Each must give consideration to the special technics pertaining to foods mentioned in the same place. Beyond this each proposed test represents an individual problem which requires: (1) Strict adherence to fundamentals, (2) utilization of previous experience of yourself and others, (3) common sense.

Interpretation cannot be too dogmatic. We are dealing with probabilities rather than certainties. It is healthy to maintain a critical attitude and to attack the same problem by two or more different methods. If results check, and if repeated tests yield consistent results, then we can feel much more confident of the reliability of our conclusions.

One thing is certain, after any honest, carefully conducted consumer preference test, we always know more than we did before. This knowledge can be usefully applied.

Literature References

Literature on the general subject of market research is voluminous. No attempt will be made to cover this here. Two recent standard books on this subject, each containing excellent bibliographies are:

American Marketing Society, "Technique of Marketing Research," McGraw-Hill Book Co., New York, 1937.

Lyndon O. Brown, "Market Research and Analysis," Ronald Press Co., New York, 1937.

It is quite remarkable that neither of these two otherwise excellent standard books contains anything more than a fleeting reference to the specific technic of the determination of preferences for food products. The general neglect of this field of consumer research is the justification of the present symposium.

The general subject of polling public opinion on any subject by means of very carefully selected representative samples of the population in question is given by:

George Gallup and Saul F. Rae, "The Pulse of Democracy: The Public Opinion Poll and How it Works," Simon & Schuster, 1940.

For a summary of the literature on the technic of judging food flavors from the point of view of physiology and psychology, see:

E. C. Crocker and W. Platt, Food Flavors—A Critical Review of Recent Literature, *Food Research* **2**, 183, 1937.

This contains a good bibliography of the literature on this subject which is so widely scattered among several different sciences.

Getting down to the specific subject of consumer preferences for *food products*, two basic popular articles containing the fundamentals are:

Washington Platt, Scoring Food Products, *Food Industries* **3**, 108, 1931. This was reprinted twice in expanded form. Reprints are available from the author.

Washington Platt, Evaluation of Consumer Preferences for Food Products, *Food Industries* **9**, 7, 1937. Reprinted in expanded form.

In 1937 the American Chemical Society held a "Flavor In Foods" Symposium. All articles were published by the Journal *Food Research* **2**, No. 3, 1937, The Garrard Press, Champaign, Ill. Besides the article by Crocker and Platt above mentioned, the articles making up this Symposium were:

Paul E. Howe, and Nicholas G. Barbella, The Flavor of Meat and Meat Products.

John W. Hassler, Use of Activated Carbon for Correction of Flavors.

Florence B. King, Obtaining a Panel for Judging Flavor in Foods.

E. K. Nelson, Flavor of Alcoholic Beverages.

M. E. Parker, and G. W. Shadwick, Jr., Chemical Determination of Aroma in Butter and Butter Cultures.

Washington Platt, Some Fundamental Assumptions Pertaining to the Judgment of Food Flavors.

Bernard H. Smith, Modern Trends in Flavors.

L. M. Thurston, Oxidation in Relation to Off-Flavors in Milk and Certain Milk Products.

E. C. Crocker, Measuring Food Flavors.

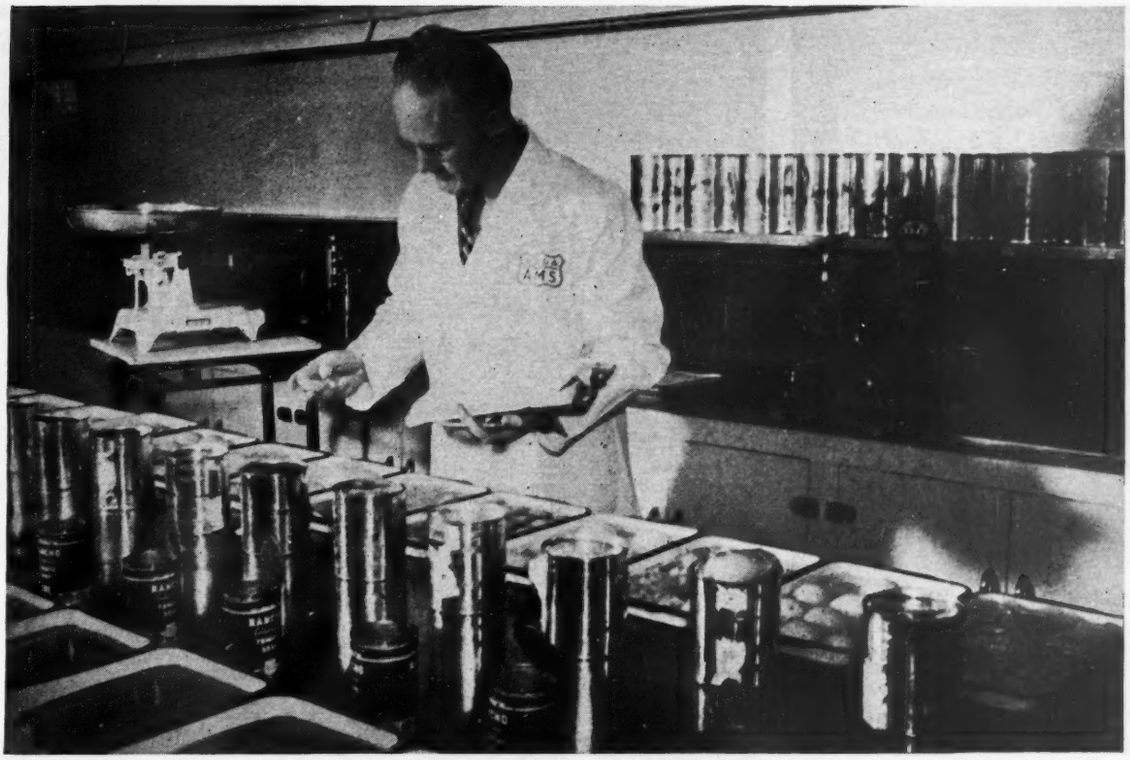
To these references should be added:

E. H. Scofield, Preferential Odor Rating of the Essential Oils of Coriander Seeds. Bulletin National Farm Chemurgic Council, 50 W. Broad St., Columbus, Ohio, 1940.

This describes a useful method when many samples are to be compared.

C. H. Bailey, Influence of Dry Milk Solids as a Bread Ingredient upon Bread Consumption. *Northwestern Miller and American Baker*, Dec. 6, 1939.

Copies of this are available from the Editor of the present Symposium.



AMS cuts, scores and certifies the grade the morning after products are packed.

"U.S." Grade Labels Gain Converts

In spite of earlier protests against grade labels, an increasing number of canners are using AMS inspection and grading. This is significant. When A. & P. introduced A, B, C grades for canned foods, there was only a ripple of interest in the trade. Now "U.S." grades are rocking the boat.

By IVAN C. MILLER, *Distribution Editor, "Food Industries"*

FOR some years there had been more or less of a stalemate in the grade versus descriptive labeling situation. Then came a development which upset the balance. The 1939 cherry pack of Cherry Growers, Inc., cooperatively owned canning plant at Traverse City, Mich., was processed under the continuous inspection of the Agricultural Marketing Service of the U. S. Department of Agriculture. And AMS not only made the inspection, but it certified the grades, using A, B, C nomenclature as well as "Fancy," "Choice" and "Standard." Descriptive information was also included on the label.

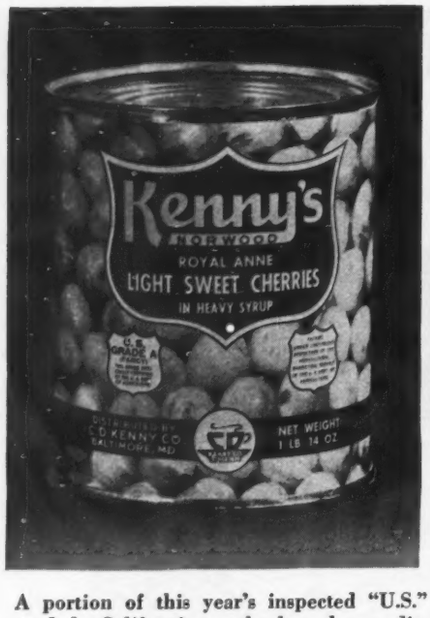
This experiment in voluntary grading (certified "U. S." grades under continuous Federal inspection) was at the time viewed with interest and concern not only by the canners but by other branches of the food industry.

And during 1940, part or all the products of three other canners were packed under continuous Federal inspection and A, B, C graded according to "U. S." grade standards. The additional canners using AMS inspection service during 1940 were: Schuckl & Co., Inc., San Francisco; United States Products Corp., San Jose, Calif.; and Curtice Bros. Co., Rochester, N. Y. At present, the 1941 canned citrus fruit pack of two Florida canners—Florida Fruit Canners, Inc., Frostproof, and Wegner Canning Co., Eustis—are being processed under continuous Federal inspection and labeled with "U. S." certified A, B, C grades.

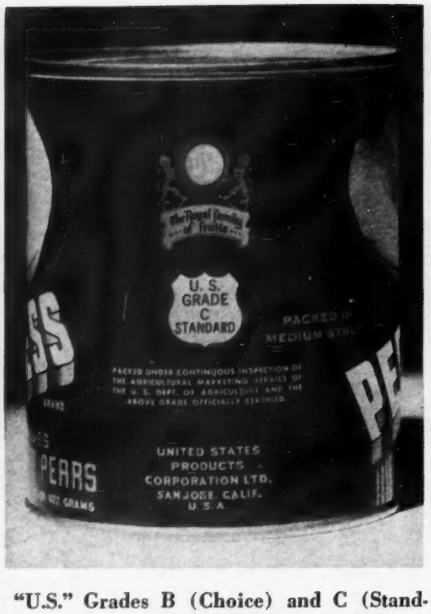
Just how many canning companies during 1941 will have government gradings on their labels as a result of AMS continuous plant inspection has probably not yet been determined, even by AMS. It is certain, however, that all requests for the service will not be granted. Although AMS has made no statements as to the number of requests made, it is probable that the number is both considerable and representative.

AMS plans to extend the service in 1941 to cover both large canneries and quite small ones. Particularly, it plans to extend it to vegetable canners, hoping thereby to enlarge the scope of the experiment—it is still considered an experiment.

Applications for continuous Federal



A portion of this year's inspected "U.S." graded California pack has been distributed in the east by C. D. Kenny Co., Baltimore.

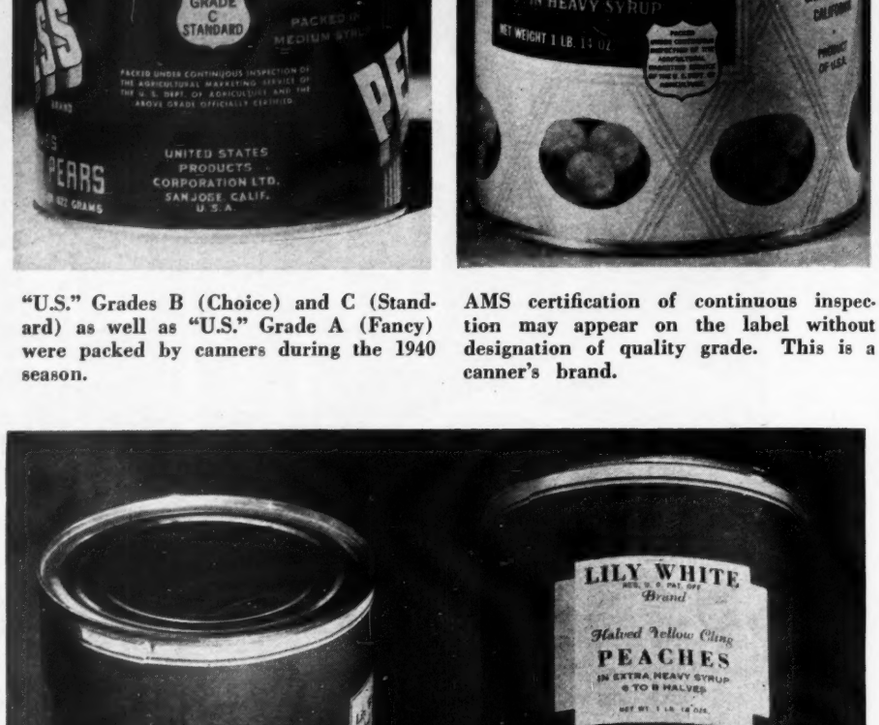


"U.S." Grades B (Choice) and C (Standard) as well as "U.S." Grade A (Fancy) were packed by canners during the 1940 season.

AMS certification of continuous inspection may appear on the label without designation of quality grade. This is a canner's brand.

inspection and government grading service come voluntarily from canners. The fact that AMS has plans for expansion of the service in 1941 would indicate no lack of applications.

Anyway, to date six canning plants have placed on the market canned fruits and vegetables with labels bearing a Federal "shield." There are two types of shield. One designates that the contents were "Packed under continuous inspection of the Agricultural Marketing Service of the U. S. Department of Agriculture." The other shield carries a grade designation (U. S. Grade A Fancy, U. S. Grade B Choice, etc.) and is accompanied by this statement: "Packed under continuous inspection of the Agricultural Marketing Service of the U. S. Department of Agriculture and the above grade officially certified." These two shields on labels have introduced a new set of conditions to add to the confusion as to what shall appear on the label of canned and preserved foods.



A portion of the 1940 pack inspected and graded by AMS has reached the market bearing private labels.

Other A, B, C Grades

1939 was not, of course, the first time that A, B, C grades of canned fruits and vegetables had been offered to the public. Toward the end of 1934, Great Atlantic & Pacific Tea Co. applied A, B, C grading to the labels of many of its brands. And a few weeks ago this company extended those grades to all of its products for which the government has established standards.

When A. & P. introduced A, B, C grade labeling, the experiment was viewed by many canners with apprehension. The results, however, were not startling. Consumers were not stampeded. Buyers on the whole were little more than indifferent.

Organized groups of women had demanded A, B, C grades of canned fruits and vegetables as a boon to the 30,000,000 or more homemakers they professed to represent. Though the A. & P. experiment did not conclusively prove their case, they continued to insist on A, B, C grades on labels.

In the light of evidence that A, B, C gradings on labels were not important to the rank and file of consumers, the canners as a group continued to disapprove any move toward A, B, C grading and relatively few distributors or canners have adopted the grade label. Many canners, however, have added descriptive and informative material to their labels.

What the U. S. Grading Service Is

According to the July, 1940, bulletin of AMS: "The plants of canners participating in this experiment have been thoroughly inspected to make sure that sanitary conditions meet the rigid requirements of the service. Good housekeeping rules have been laid down, and one of the inspector's duties is to see that the rules are strictly observed. All employees who handle food must have passed a physical examination, and prod-

ucts are carefully inspected for wholesomeness and quality as they are packed into the cans."

AMS inspection of a plant, prior to acceptance for continuous inspection and quality grading according to U. S. grades, concerns itself with the provisions for adequate control of sanitation and also the provision for adequate inspection. Provisions for sanitation include general cleanliness and appearance of plant, adequate means of keeping floors and equipment washed and clean, location and condition of washrooms and toilet facilities, and other means of maintaining personal cleanliness and health of employees. Adequate inspection facilities include character and condition of inspection belts, lighting, and so forth.

From those who apply for AMS inspection service, AMS requests information regarding the number of items packed, period of time devoted to packing each item, the number of cases of each item packed, the number of shifts worked during the packing season, the starting date and finishing date for packing each item, and so forth. Acceptance of a canning plant for AMS inspection and grading service is only possible after the plant has been inspected by representatives of the Department and at the discretion of the Department.

AMS inspectors, once a plant has been accepted for the service, "observe the preparation and pack of the product to be certified at each step in the canning process." On the day following packing, cuttings are made for scoring and certification of grades. Each shipment is certified. AMS inspects sanitation and methods of preparation of products for canning and checks final quality in terms of U. S. grades. AMS is not concerned with the canner's process so long as it produces a sterile product above a minimum acceptable quality.

AMS inspectors are Civil Service employees. Junior grade inspectors, men who have had college training in appropriate agricultural courses or who have had training and, in addition, a sufficient number of years of experience in food plant operation, check (inspect) incoming raw materials. They also check cans for proper pack and fill. The junior inspector does not certify grades. Included among the junior inspectors are students in food technology courses who are employed during summer vacations at a salary of $135 per month.

Protective Provisions

AMS endeavors to provide, as nearly as possible, complete protection to canners employing the service. The U. S. shield is embossed on the can lid to prevent any misuse of shields bearing labels on uninspected and non-government-graded products.

Inspectors are rotated from plant to plant to keep the quality of inspection as high as possible. This is a protection to the buyer, ultimate or intermediate.

Canning processes and secrets are protected, too. The severest discipline, permanent dismissal, is the penalty upon the discovery of "peddling" any information about any plant or any operation.

Cost of Service

Members of the canning industry have expressed the belief that the use of government grades would produce the following undesirable results: Deteriorate quality to the minimum allowed for each grade, freeze prices for each grade, decrease advertising, depreciate the value of the brand name and add excessive inspection costs. It is too early to judge all the results of the recent experiment. Cost figures, however, are available for those plants where AMS has inspected and graded.

The canner whose products are inspected and quality-graded by AMS bears all the cost of the service. The cost includes the salaries of the inspectors and AMS overhead necessary to the service at that plant. During the 1940 season, the gross cost at different plants, according to the size of the pack, number of items packed, length of season and other conditions, varied from ⅓ cent to ¾ cent per case. These are AMS figures.

This is gross cost per case, obtained by dividing total cost by the number of certified cases, and does not allow for savings which might have accrued as a result of the service. AMS takes credit for no saving except that resulting from lowered cost of samples for cutting.

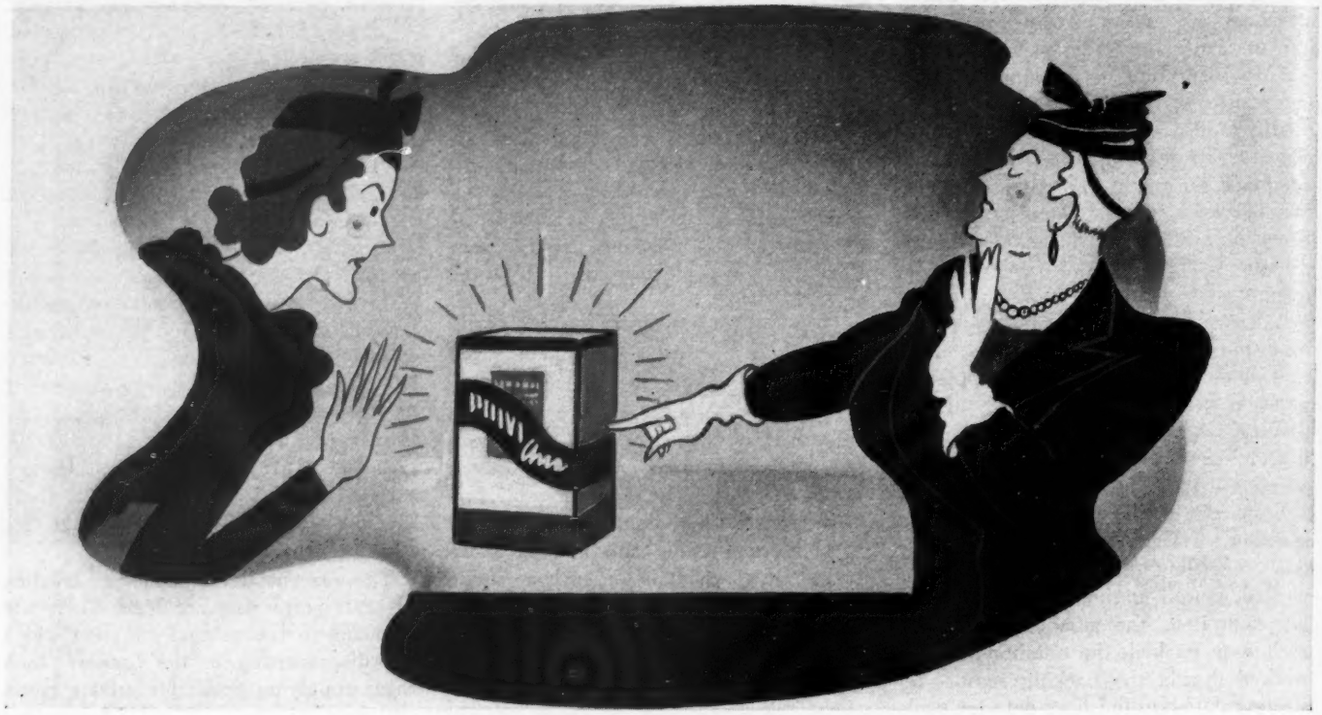
When a canning plant is operated under continuous inspection, only one-third as many cans are cut for scoring and establishing certified grades as are cut for canners not operating under continuous inspection. The extent of this saving, in proportion to the cost of the service, may be considerable.

If what is still considered by AMS as an experiment proves successful, AMS will hope for a wide voluntary extension of the service. AMS is hopeful of increasing the consumption of canned foods as a result of the service, thereby bettering the lot of the canner and the farmer producing canning crops. It is, therefore, AMS's desire that either continuous Federal inspection or U. S. grade labeling, or both, will stimulate canned food consumption.

The present development in labeling presents perplexing problems. There are elements in the present situation which are disconcerting to the canners, both those supplying packs for private labels and those who have expended large sums to create acceptance for their own brands. Other food manufacturers, too, are concerned with the situation.

Many studies and investigations are being conducted to measure the results of the new developments. From these studies will no doubt come some conflicting results. There will also be some surprises—surprises for food manufacturers, for organized consumer groups and possibly also for some bureaus of the Department of Agriculture. FOOD INDUSTRIES will attempt to follow the developments in the new "experiment" in grade labeling and continuous Federal inspection and report on it in future issues.

AMS insists on good housekeeping. All employees in the plant of Schucke & Co., San Francisco, handling food prior to closing in the can, wear uniforms.



"Horrors! My dear, you can eat only the contents, but you have to pay for the package!"

The Package Is on the Spot

It is being blamed for raising the cost of foods by some consumers, consumer groups and even the government. And there are those who would return to cracker-barrel packaging. This criticism is not justified, as cost figures demonstrate

By WILBUR F. HOWELL, *Secretary, Robert Gair Co., New York, N. Y.*

As we passed out of the age of bulk and admittedly unsanitary foods, and progressed through the years into the package age, there was no crowning with laurels, no victory parade, no acknowledgment other than unresponsive acceptance. And that was as it should be. Now we are in the package age. The development stage is over and the growing pains too, but not the headaches of maturity.

Today food of every kind is preserved in the package, preserved against the attack of mold and bacteria, protected from contamination from dirt and filth. The package is the safeguard of personal and of public health. It has guaranteed safety and sanitation, and it is responsible for no small amount of satisfaction to users because of the appearance and convenience of the package itself.

We are in the package age, beneficiaries all—yet the package is on the spot.

The three decades following 1900 witnessed the growth of packaging. The last decade has been an era of package remodeling, packaging improvements. There have been cases where packaging has gone to unjustified extremes. Generally, package changes have increased the protection of the contents—extended its shelf life or improved its convenience in use. Package changes have also effected economies which have reached consumers. But in spite of all this the package is on the spot.

Blame Prices on Package

Somebody said, just when and where is of little moment, that food prices were too high. The world heard about it, and of course, agreed. The farmers said, "not guilty," and with the aid of Washington proved they were getting the tail-end of the consumer's dollar.

Distributors claimed savings through improved distribution methods and modernized merchandising. They also took credit for passing on the savings to consumers. Though the chains offered a convincing story based on logic and rock-bottom prices, they drew a penalty tax in many states.

Food manufacturers have three rabbits in the hat, increased taxes, increased hourly wages, meager net profits. The package, so much in evidence, is not vocal. Result—on the spot.

The package is held to blame for the high cost of foods, so much so that many, forgetting the conditions which forced consumer-package adoption, advocate a return to bulk foods—a return to the cracker-barrel age. How widespread is this view can be measured by the volume

and also the nature of package criticism.

The package—mostly in the abstract, to be sure—gets a flailing at all too many gatherings of organized women's groups. Even the Federal government has been vocal, condemning the package—advocating food sales from bulk stock. Within the current year the *New York Herald-Tribune* reports "a return to the old-fashioned cracker-barrel, flour-bin, kind of grocery business—as a side line to the well wrapped quality specials of the modern grocery—is the administration's latest idea of moving food surpluses off crowded shelves. Jesse W. Trapp, who has distributed farm surpluses to relief families for the government, has suggested to leading food distributors that they offer plain foods without fancy wrappings to housewives with small pocket-books."

Jesse W. Trapp, mouthpiece at the time for the government, condemns the package only when it surrounds farm surpluses to be distributed to the poor. But the implication condemns the package—all packages. He expresses the viewpoint of far too large a group and what is worse, a group that is growing.

However unfortunate it may be, the lay approach and often the experienced approach to the study of package costs preclude consideration of retail sales costs in the handling of bulk and packaged foods. Of course, the costs vary for different types of stores and even for different stores of a type. The figure for some bulk foods, mostly fresh goods or meats, is placed as high as 35 to 37 percent above the selling cost of packaged foods. This figure does not include the cost of the grocer's packaging material.

If the grocer could weigh and stack or wrap a pound of crackers at a saving of ⅓ cent, or even as much as a cent, a pound it is doubtful if any of the margin conserved would pass on to the consumer. It is also doubtful if the large variety of popular highly shortened so-called butter crackers would withstand the handling if packed in bulk, presuming the consumer were willing to accept the staling or the exposure to dust and contamination in the store.

As a matter of fact, it is doubtful if grocery store packaging of bulk-shipment foods could effect any appreciable saving. Plain bags necessary for grocery store packaging would run from 8 for 1 cent to 5 for 1 cent. String or tape would be required. Grocers' or clerks' time, based on two packages a minute, at a 50-cent-an-hour rate, would equal $0.004 a package. One-pound food cartons in two colors, as used for sugar, coffee, and so forth, cost the manufacturer in large lots approximately $5 per thousand, ½ cent each. Forming, filling, weighing and sealing cost approximately 52 cents per thousand, or $0.00052 per carton. These figures cover all charges, including depreciation, power, labor, and so forth.

Packaging Costs for 1-lb. Carton.

Manufacturers' packaging versus store packaging

Machine filling, 60 units per minute

Cost of operations per unit	$0.00052
Carton cost per unit	0.005
Total	$0.00552

Hand packaging, 2 units per minute at 50 cents per hour. Bags at $1.50 per thousand

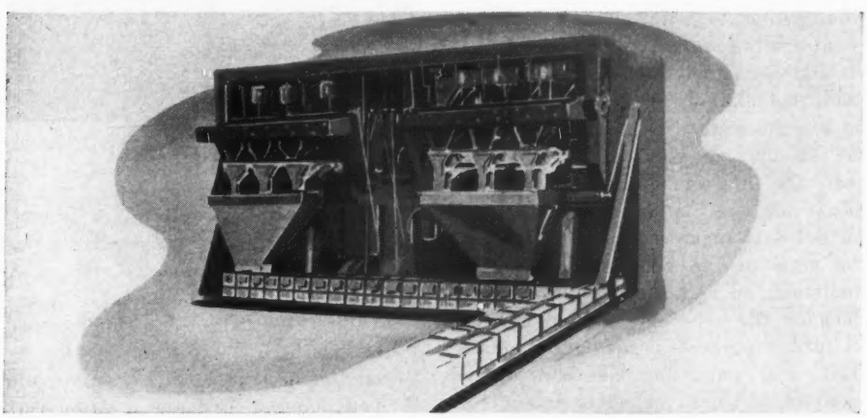
Cost of bag unit	$0.0015
Cost of operations per unit	0.004
Total	$0.0055

Package Worth Defending

The food manufacturer's package guarantees net weight to consumers, and the Food and Drug Administration polices the guarantees. This is better assurance of full measure than can be guaranteed by the many scales and human errors in 600,000 food outlets. The package is of definite worth to the consumer.

But is the package worth defending? Does it hold advantages to manufacturers worth protecting? The manufacturer's package is the best assurance that the quality the manufacturer labors to put into his product shall reach the buyer unchanged. It prevents tampering or adulteration of the contents. It assures uniformity. It also permits the use of brand name, brand advertising, brand merchandising, the advantages of which the manufacturer can best judge.

The advantages to food manufacturers are worth conserving. So also are the advantages to American homemakers. As Don Francisco, president of Lord & Thomas, has said, "American industry has been too modest about its contributions to social welfare—people don't understand that the American system—with the efficiency of mass production and mass distribution, with its incentive for individual or corporate initiative, with the premiums for resourcefulness and industry—tends inevitably to produce better goods at lower cost. Nor do they understand that as the price of goods is brought down, the standard of living goes up. We must interpret the social service of each industry or business in the specific terms of what it means to the man on the street." And it is high time the food industries were doing it—schooling retailers as well as consumers, and not omitting clearing away all misapprehension regarding the package.



Many consumers still don't see the quality protection, sanitation, economy and guaranteed weight afforded by machine packaging in the factory. They would return to the "cracker barrel" era of store packaging, with all its evils and with no gain in economy

Confusion About Fortification

Debunking the faddists and enthusiasts. Bran layer removal from flour by sifting, a practice only 5,000 years old! People also remove egg shells, orange peels and pea pods. American public ate white bread even before the roller mill and purifier. And why standardize at whole wheat nutritional levels?

By OSCAR SKOVHOLT, *Quality Bakers of America, New York, N. Y.*

IT is unfortunate that sensational stories about clinical uses of vitamins and amazing resulting cures have been appropriated and transferred bodily to the field of national dietetics. Therapeutic use of vitamins by the physician in the practice of clinical medicine is one thing; the national diet is something else, quite different. If confusion exists, which it assuredly does, it is partially due to contradictory evidence as to the need for more vitamins by the average individual, not the exceptional individual who is often the clinical case.

Information as to the actual level of vitamin intake in the American diet is inadequate largely because of the newness of the method used for ascertaining the amounts of vitamins present. Not only are they of too recent origin to allow for any large accumulation of factual data regarding vitamin intake of the mass of the population, but these analytical methods are also slow, cumbersome and none too reliable. But until further progress is made in standardizing and improving the methods of analysis, and until extensive amounts of data are accumulated from more precise methods, the critical evaluation of our national dietary is necessarily based on rather meager data, and those data are likely to be influenced by reports of sensational clinical cures.

Much of such criticism is, perforce, based on reckonings, not always on actual analyses. Yet, to calculate the vitamin intake, the critic must choose some value for the vitamin content of foods from the rather wide extremes of values obtained by analysis. Some investigators have reported many diets as below 200 International Units per day in vitamin B_1 content, whereas it has been contended that a common Army diet provides 1,000 I.U. per day of this factor. A part of the difference is undoubtedly due to menu planning, but it also seems reasonable that different bases

OSCAR SKOVHOLT

for calculation are contributing factors. Butter, for instance, reportedly varies from 1,000 to 6,000 I.U. of vitamin A per pound, while whole milk ranges from 100 to 400 I.U. of A per 100 grams. Wheat has been found to test as low as 200 and as high as 1,000 I.U. of vitamin B_1 per pound. A dozen oranges may have anywhere from 20 to 70 mg. of vitamin C, while the same number of tomatoes are credited with values from 9 to 40 mg. Many other comparable variations could be reported covering most of the common foods and the variability of every vitamin and mineral that has been suggested for use in enrichment. It is decidedly unlikely that the diet of any person will be consistently at either the highest or the lowest figures reported for all foods as regards vitamin or mineral content. And because it is not yet possible to predict with certainty when a food will have its highest or lowest vitamin value, it must be assumed that there is an averaging effect when foods are obtained from different sources or when many different lots of the same food are mixed.

Figures such as the preceding suggest a real difficulty in calculating the vitamin content of the diet, and they show that opportunity exists for the selection of figures by irresponsible overzealous persons that could prove almost any conclusion hoped for. Unless actual vitamin assays are made on each food in the diet of each group undergoing study, it is possible to demonstrate from the same set of data either a deficiency or an ample supply of many factors in the diet. The compromise remedy is, of course, a selection of the correct average figure when actual assays are lacking.

Yet even this is not wholly reliable unless both daily requirements and daily intake are determined for each individual before deciding that increased levels of these factors are needed. It is common knowledge that some people eat less than others. The Food and Drug Administration is attempting to reconcile many divergent opinions when establishing standards for minimum amounts.

When it comes to the question of how much restoration or fortification is proper, there, likewise, is a point of confusion. Certain advocates of restoration propose limiting it to "natural" levels from which partial losses have been caused by processing. But what is the "natural" level? Is it the highest or the lowest or the average figure obtained by assay of an un-processed material?

Even where processing does not cause appreciable loss of vitamins (butter or tomato juice manufacture), it is conceivable that such foods that may naturally be low in vitamins (A or C) should have their natural vitamin content supplemented by fortification. It seems to be just as much in the interest of the consumer to maintain uniform or constant levels of the vitamins as it is to replace those which may be lost in processing.

Processors of many foods have been accused of unknowingly contributing to serious dietary deficiencies by removing

valuabe food factors. But the accusers appear to ignore the fact that consumer desires are wholly responsible for the changes in processing which have brought about such losses. Greater refinement in manufacture of sugar and flour have meant more complete elimination of microorganisms as well as more thorough removal of less digestible and less palatable fractions. Despite the merits of arguments that fortification is for the benefit of the consumer, it is most unfortunate that recourse to such untrue and unfair accusations and to improper interpretations of facts is all too frequent. It is the consuming public's greater acceptance of the more refined foods rather than crude foods, which is responsible for the manufacturer's heavy investment in the processing equipment that now receives unwarranted censure.

The probable standards for enriched flour and bread have recently been indicated. Some of the arguments advanced in favor of such fortification or restoration may still be reviewed with profit. This should not be construed as an argument against some type of restoration of food values but merely as an attempt to point out some apparent inaccuracies of fact and interpretation. It certainly is advisable to continually review facts as they are rapidly being discovered in the field of nutrition, hence standards should only be regarded as tentative.

The whole wheat berry is often assumed to carry the right amount of various vitamin and mineral factors for human food, without any consideration given to variations in wheat, how much of it is eaten, or how much the individual may need from this source in addition to what may be obtained from other foods. Why is the wheat berry sacred? Why should it be assumed that the proportions of food factors in the wheat berry were selected with any regard for human nutritional needs? The wheat berry is designed to produce a new plant and is used for this purpose except for the bran layers which serve to protect it until conditions are suitable for germination.

And why is it less ethical or less logical to render wheat more palatable by removing its outer layers than to remove the shell from the egg, the shell from the peanut, or the lima bean, or the cob from sweet corn?

A fairly complete removal of the branny layers from the wheat kernel is the most recent separation merely because of the difficulty of its accomplishment.

How It Came About

Apparently the only reason that can be ascribed to the belief that white flour or white bread should contain all the nutritive factors of wholewheat is that bread was once made entirely from wholewheat. It is, however, an error to regard the change of vitamin content of flour from whole grain to white flour levels as a change that occurred suddenly through the advent of the roller milling process.

Most of the removal of vitamins in milling occurs when the branny layers of wheat are eliminated from the flour by sifting. Efforts to separate the branny layers from flour is nothing new; it has been done since the third Egyptian Dynasty, about 3,800 B.C., the date of earliest record. For the past 5,000 years man has striven to improve his separation operations in order to produce a more palatable bread by the better elimination of the indigestible outer bran layers. The latter material has been sold as mill feed for many generations.

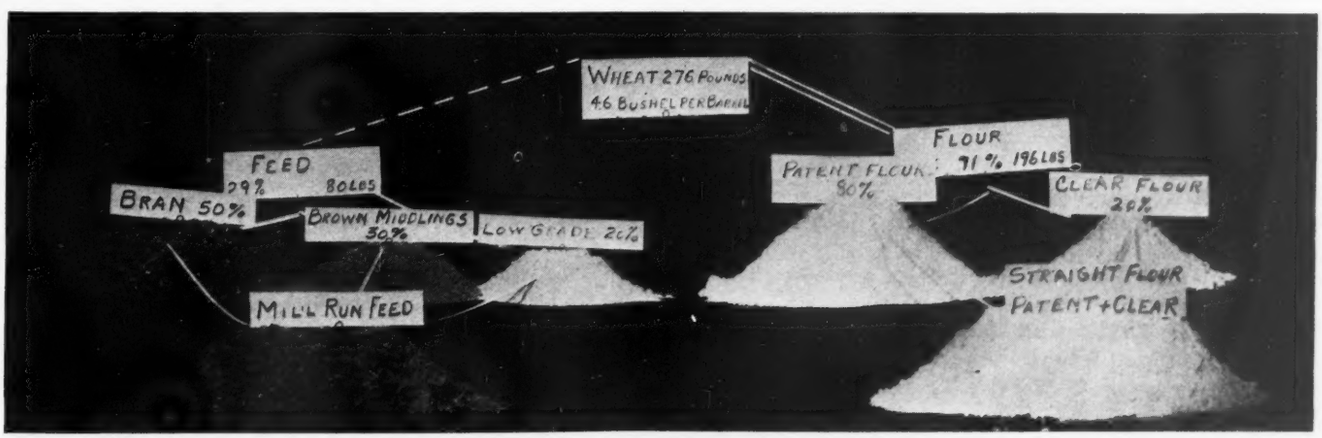
The first use of rollers in the milling process about 60 years ago is erroneously credited with introducing the removal of most of the vitamins and minerals from the flour. What was chiefly responsible for the further refinement of that time was the piece of separating equipment called the "purifier" which was introduced almost simultaneously with the roller mill. The purifier makes it possible to more completely eliminate the fibrous matter before the final grinding operation takes place and is readily usable only in a roller milling system.

As to wheat germ, competent millers have expressed the opinion that buhrstone grinding methods make germ retention in sifted flours more difficult than the use of roller mills. Obviously, the popular story that credits (or discredits) roller milling with the first removal of wheat germs is not in agreement with facts.

It is impossible to recapitulate the history of milling technique in so short a discussion, and likewise it is impossible to establish with accuracy the vitamin content of the nation's bread throughout its history, yet it is fair to emphasize that the outer coatings of the wheat berry have been eliminated from most bread because of the public preference for other fractions of the wheat berry. The germ, however, is a relatively minor source of this vitamin and arguments for or against its retention in flour or for its palate appeal are not of major nutritional importance, though much debated today.

In the debates for or against restoration of white flour to whole wheat nutritive levels, many make the error of assuming that diets of 60 to 100 years ago included only bread of the wholewheat type. That assumption is wrong because it is not true. Nevertheless past practices are of much less importance than the adequacy of present-day diets, and have importance only when attempts

(Turn to page 108)



Modern milling practice makes it possible to separate the wheat berry into these component parts, culminating five thousand years of effort by mankind to remove the branny material from wheat flour. And because of this accomplishment millers are now being erroneously blamed for robbing flour of its vitamin value. Actually, consumers are responsible for the change because they demanded bran-free flour. This is one of many points of confusion about the fortification of bread.

Some of the cheeses and substitute types favored by American importers: Argentine Blue; Gruyere, Camembert and Sap Sago from Switzerland; and Cheddar from Canada. With Portuguese Serra and Romano, these are now the chief imports.

Western Hemisphere Cheeses Replace European Imports

Blocking of foreign trade has created a market for Argentine cheeses and stimulated U. S. manufacture of foreign-type cheese. With continued progress we may hold the market permanently

By ALLEN CHAFFEE, *New York, N. Y.*

AMERICAN cheese brokers, long dependent on European importations, are turning to Argentina, Canada and the United States for substitutes for famous foreign cheeses. Government figures show that cheese imports from all sources fell off nearly two-thirds in the twelve months between November, 1939, and November, 1940, and of the imports received, a large quantity have been Argentine imitations of European types, which have been coming in since May, 1940. Including the South American shipments, our cheese import was only 2,260,737 lb. in November, 1940, as contrasted with 6,343,578 lb. the November preceding. The breakdown was as shown in Table I.

Among the more important types of cheese which, under war conditions, can no longer be shipped to America, are French Roquefort, all of the Italian hard-grating cheeses such as Parmesan, English Stilton, Netherlands Edam and Gouda, Danish Bleu (Blue) and some of the Scandinavian goat's milk cheeses.

America has never been as cheese-conscious as most European countries. However, for the past decade, certain of the university agricultural colleges have been experimenting with cheese types, and now that most European imports have been cut off, domestic manufacturers are advancing in seven-league boots, and may even hold the market (other than that for "Switzerland," Roquefort and Gruyere) after the war is over. At the present time, American duplicates of foreign types include: Roquefort,

Blue, Brie, Baby Gouda, Edam, "American" (Cheddar), Port du Salut, "Swiss," Limburger, Brick, Muenster, Oka (La Trappe), Myost (Primost), Nokkelost, Tilsit, Bondost, Gjetost, Scamorze, Neufchatel, Bel Paese, Dry Ricotta, Incanestrato, California Jack (hard-grating) and "Bavarian" Spread.

W. E. Wurtz, of The Borden Co., representing one of the largest cheese manufacturers in this country, feels that it would take at least a year and a half to two years for most European cheese producing countries, such as Denmark, Holland and France, to resume shipping cheese to this country. The prices on some of the items, especially those from Holland and Denmark, would necessarily have to be quite low in order to recover most of the American markets, because of the American-made products which have replaced Danish Blue and Holland Edam-type cheese. In the case of Roquefort, it is generally believed that France will regain her markets more quickly because there has been found no substitute for real French Roquefort.

T. A. Hart of Kraft Cheese Co., which has a world-wide distribution, agrees that Roquefort is in a class by itself, and has not as yet been very successfully duplicated in the United States. He says it seems likely that Europe will not be in a position for some time to come to make more than enough cheese for its own demands. There, cheese is an established article of food, and per capita consumption much higher than in this country, though in the last eight or ten years we have almost doubled our per capita consumption. Our total cheese production in 1939 was about 536 million pounds. Mr. Hart estimates the 1940 "make" as much larger. On the other hand, importers, manufacturers, brokers and distributors are not all agreed, except that Roquefort is extremely difficult to imitate even when made with sheep's milk, and Blue Cheese made with cow's milk is being largely accepted in its place.

Roquefort and Blue

In view of the war blockade and labor shortage in European countries, and in some cases the killing of fine dairy animals for meat, France is unable to send us the Roquefort she originated and Denmark is unable to send us her Blue cheese. However, both the United States and Argentina are making efforts to supplant Roquefort and Blue, the cheese nearest Roquefort in type, though made of cow's milk. Some of our agricultural universities have been promoting this venture.

W. B. Combs, University of Minnesota Department of Agriculture, says: "Back in 1933 we became interested in the possibilities of ripening certain mold-ripened cheese in large sandstone caves which occur along the Mississippi River in St. Paul and Minneapolis. Since 1933 we have manufactured here at the University of Minnesota over 275,000 lb. of Blue cheese. This cheese has been marketed in this state and in various parts of the United States. We have received very favorable reports upon this cheese and believe that we have been able to produce one which meets the public's demand very satisfactorily.

"The natural facilities for ripening cheese which exist in this area will have much weight in effecting future developments. These caves, which are available in any number, hold a temperature of 49.5 deg. F. to 51 deg. F. throughout the twelve months of the year. They remain constant from day to day and week to week. The relative humidity ranges around 95 percent. There is enough cave space in a very small area in a section in St. Paul to ripen all the blue-veined cheese that could possibly be consumed in America for some time to come. These caves not only offer facilities for the ripening of Blue cheese, but also other types of cheese such as Trappist, Port du Salut, Gorgonzola, Stilton and Cheddar.

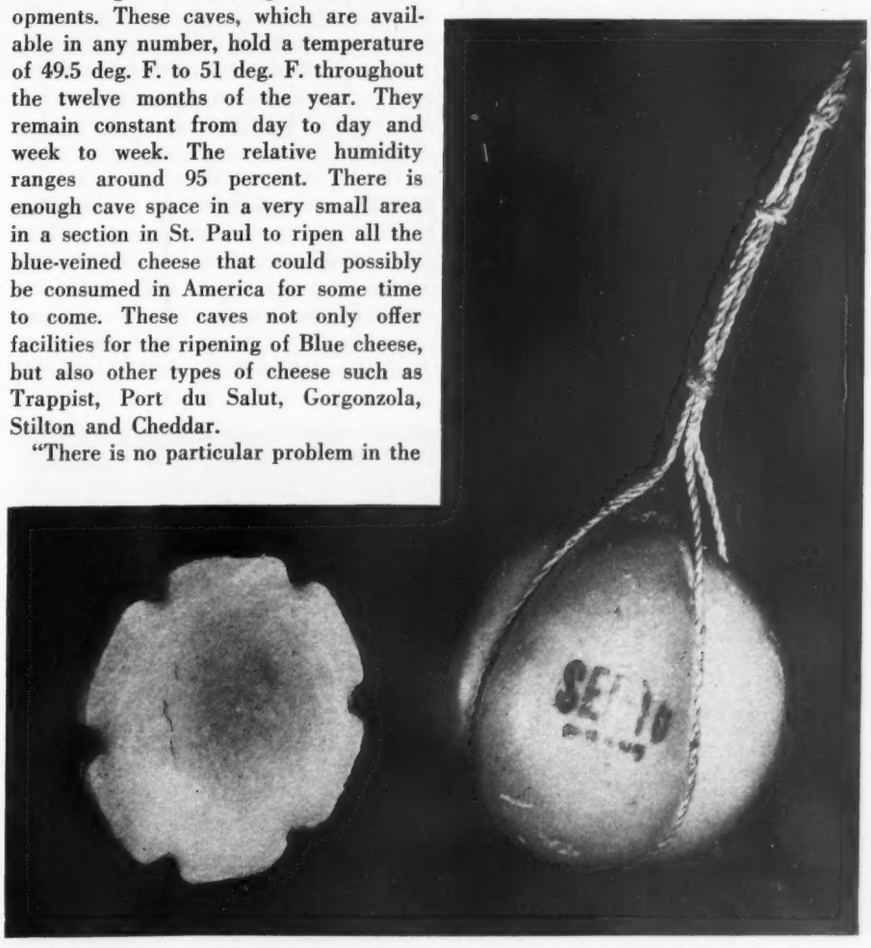
"There is no particular problem in the manufacture of the cheese made in Europe. Scandinavians, Italians and others naturally make the types of cheese they had in the old country." And he does not feel that we would be "particularly infringing upon anyone's rights if we choose the names of cheeses originating in Europe.

W. V. Price, professor of dairy industry, University of Wisconsin, writes, "I believe that using European names for the domestic product is not only an unfair practice, but is an unwise practice in the long run." He says with regard to our production of imitations of certain less well-known foreign varieties, for example, Bondost, Danish Muenster, Tilsit, Gjetost and Nokkelost, "if properly made they should lead to increased permanent outlet for our milk." But he feels emphatically that "such a manufacturing program should not attempt to capitalize on the temporary misfortunes of the European industry."

The French village of Roquefort has maintained its right to the use of this name for the mold-ripened cheeses made from ewes' milk and ripened in the cold moist caves of Combalon, whereas cow's milk cheeses ripened in other parts of

Table I—Imports of Cheese

Type:	Nov. 1940	Nov. 1939
Roquefort	.....	436,008
Blue Mold (original loaves)	202,072	481,404
Parmesan or Reggiano	152,882	335,435
Provoloni and Provolette	48,402	175,366
Romano or Pecorino	538,965	2,215,754
Swiss:		
Emmenthaler, with eye formation	274,860	767,969
Gruyere	146,709	574,874
Edam and Gouda	85,456	219,639
Cheddar	47,781	400,402
Other	763,000	.....



Italian Provoloni, at the left, is being replaced by Provoloni manufactured in the Argentine (right). Kraft Cheese Co. has been experimenting with Provoloni and other Italian types such as Reggiano, Gorgonzola and Sardo.

France with the same green mold are known as Blue cheese, according to Circular No. 187 issued by the Division of Dairying at the New York State Agricultural Experiment Station.

Argentina has for some months been making Danish-type Blue cheese, and Murray Weil of June Dairy Products Co., Inc., says the imports of French Roquefort have been offset by about 90 percent by this Argentine Blue, while 10 percent have been offset by American production of Roquefort-type Blue.

Argentina's great flocks of sheep are wool bearers for the most part rather than those reared for butchering, and are not generally milked. Argentina has, however, begun to experiment with sheep's milk Roquefort, as well as the Blue that looks so like Roquefort. The flavor isn't there, though, in the opinion of at least one importer, Rudy Faendrich, New York, who sells to the jobbing trade and knows what hotel customers like. He says he was getting small shipments of Blue from Iceland, but they petered out, and he has found Argentine Blue not very dependable. He thinks "business is coming their way too fast and they are new at it." And since they are making it at approximately the same price as we do in the United States, he thinks the North American Blue eventually will prove more satisfactory than the South American product. At present, of course, U.S. manufactures are not large enough to meet the demand. He believes that the shipments of Blue from Argentina expected by the last of February might be of better quality.

Our Pacific Northwest is also coming to the fore in cheese making. Government figures, which show a slight dropping off in New York and Texas, indicate an increase in Oregon and Washington. And according to H. H. Wilster, Professor of Dairy Manufacturing at Oregon State College, a cheese factory in Langlois, Curry Co., Oregon, is manufacturing a Roquefort-type cheese, using mechanical refrigeration for the maintenance of the proper humidity. Then there are natural lava caves in use for curing Roquefort-type cheese in the vicinity of Trout Lake, Wash., in which the State College of Washington is interested.

Some ten years ago experiments on a small scale were promoted at Grove City, Pa., with a Blue cheese as a substitute for Roquefort. The Borden Co. worked there for years with the Federal government, though it now uses hillside caverns in New York. And June Dairy has worked out some Blue cheese spreads, including a "Bavarian" blend that is deservedly popular.

At Cannon Falls, Minn., Mr. Hart tells us, Kraft Cheese Co. has ripening caves, and also uses an abandoned coal mine at Blairsville, Pa., for the purpose. And at Thorp, Wis., according to Mr. Weil, June Dairy makes a Roquefort-type Blue cheese. They have a plant with an air-conditioned silo and a big natural cave-type cellar for curing the cheese. Of the fifteen or so manufacturers who are making Roquefort-type and Blue cheese in the United States, a number employ the damp cellars formerly used for storing beer.

The seriousness with which Roquefort is taken in America may be indicated by the fact that Georgetown University Medical School, while it does not do the actual research work with organisms used in the production of different cheeses, carries the cultures which are used in the production. J. V. Anzulovic, Assistant Curator of their American Type Culture Collection, writes us that Roquefort-type (as well as Camembert) are among the culture samples for commercial batches in which manufacturers are interested.

Gorgonzola and Parmesan

No imports of Gorgonzola, Parmesan and other Italian hard-grating types are coming from Italy, though the importer Mattia Locatelli says he is still waiting and hoping. The United States is making no effort to imitate the Italian cheeses, though California is making a hard-grating Jack cheese highly esteemed by the Italian colony around Monterey and elsewhere. Kraft has been making Provoloni since the blockade, and is experimenting with Romano, Reggiano, Gorgonzola, Sardo, Bel Paese and some other types. Bel Paese has been made by an Italian producer who patented his formula and sold American rights to a New York producer, but Bel Paese is hard to imitate in this country. June Dairy Co. is making sandwich type Italian Provoloni, Dry Ricotta, Scamorze and Incanestrato, accepted by Italians here.

South America is not making Romano for lack of sheep's milk. The senior partner of Rothenberg & Gallagher, brokers, says South American prices are out of line, and Mr. Locatelli, among others, considers the Italian-type imitations that have come from Argentina most inferior.

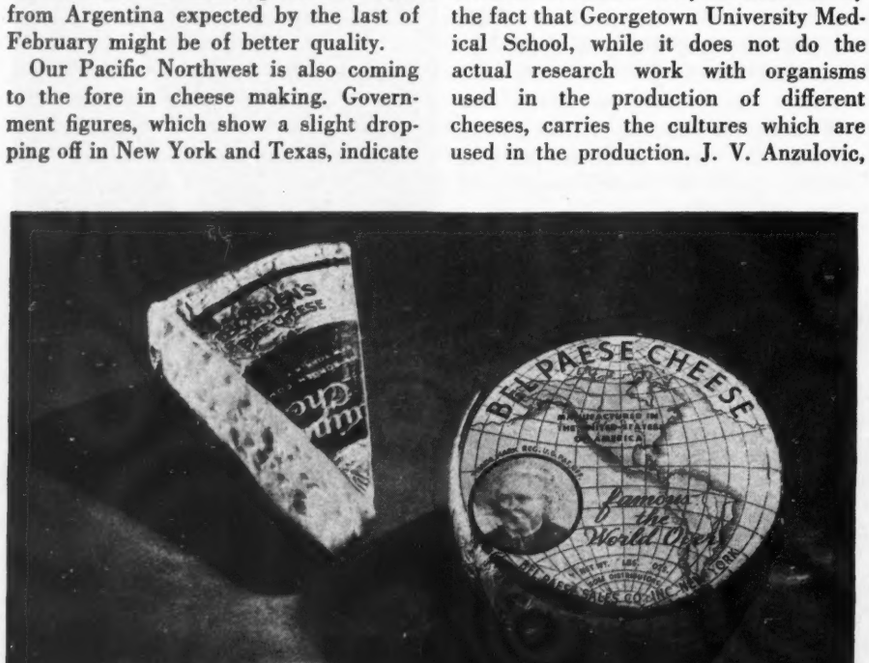
Of Italian cheeses, a New York firm says Argentine Parmesan is a poor imitation because the coagulating factor is not the same and neither is it seasoned to give the distinctive flavor associated with Italian Parmesan. But Mr. Wurtz of the Borden Co. thinks the chances are good that Argentina will come to replace Italy in the manufacture of hard-grating types, since importers get responses more readily from our neighbor to the South.

Edam and Baby Gouda

For over two years American cheese manufacturers have been experimenting with Baby Goudas and Holland-type Edam cheese, and, based on the amount manufactured in the past year, feel they have successfully passed the experimental stage as American-made Baby Goudas and Edam were readily accepted by the American housewife.

"At first," said Mr. Wurtz of The Borden Co., "the trade was reluctant to accept American-made Baby Gouda and Edam but since they have tasted them, the cheese seems to be readily accepted. We have had various distributors who did not want domestic products, but when foreign cheese could no longer be

(*Turn to page 107*)



Domestic substitutes for foreign cheeses include Bel Paese, distributed by the Bel Paese Sales Co. Inc., of New York. Borden Co. has successfully introduced the soft cream cheese Brie, comparing favorable with the French Brie.

Allocating Cost to Raw Materials Purchased in Random Sizes

Olives, oysters, potatoes and apples are among the products to which this method, developed by the pickle industry, can be usefully applied

By H. S. SCHUCART, *Secretary-Treasurer, Fleishman's Pickles, Inc., St. Louis, Mo.*

ALLOCATING cost to various sizes is a problem that arises in many food industries where the raw material is purchased as field run or in several broad size gradings and the resale prices are governed by finer sizes or grades. Curers of California olives, for example, find all sizes in the crop, and must sort and fix definite costs for each of the sizes present. Buyers of apples who purchase the pick of an orchard at a flat price have the problem of size-grading the fruit and assigning specific costs to each classification. The same problem can be found in industries as diverse as oyster packing and pickle manufacture.

In the pickle industry, the problem of allocating costs comes up every day. It arises with companies that salt and finish their own products; it arises with companies that salt cucumbers only for sale as unfinished salt stock; and it arises with the processor who buys salt stock for finishing. Consequently the pickle industry, with which the writer has been associated for many years, serves well as an example of how a method of allocating costs to various sizes can be worked out and operated.

Pricing of pickles, ranging in size from what are commonly known as 400's to 30,000's (these figures being the count per 45-gal. cask), is an old and vexing problem. Consider the position of the pickle-man who buys pickles ranging from ½ in. to 6 in. in length, and the problem which presents itself in attempting to evaluate or place a cost price on each of the sizes.

At this point, for the information of those who are not familiar with the pickle industry, pickles range in size about as follows: 30,000; 20,000; 15,000; 10,000; 7,500; 6,000; 4,500; 3,600; 2,700; 2,400; 1,800; 1,200; 1,000; 800; 600; 450; and 400. These counts represent the number of pickles contained in a 45-gal. cask. Usually, though the practice varies somewhat in different localities, these pickles are bought as raw cucumbers in two, three or four gradings by size, with prices ranging from 25c. to $1.50 per bushel to growers.

This article on

COST FINDING

Can be applied by all manufacturers who buy raw materials or ingredients in random sizes, including such food materials as:

Eggs, oysters, potatoes, apples, pickles, olives and many fruits and vegetables.

It describes a relatively simple method that, once installed, permits a rapid and satisfactory determination of costs.

The Editors

Until recent years, contracts with cucumber growers specified three gradings: (1) All straight cucumbers 3½ in. in length and smaller, (2) all straight cucumbers larger than 3½ in. and not larger than 5 in. or 5½ in., (3) all nubbins or crooked cucumbers.

Within the last 6 or 8 years many variations have been adopted by individual salters. Some agree to take field run pickings, with a provision that stock is to contain not more than a specified percentage of nubbins and must count a certain minimum number of cucumbers per bushel of 50 pounds.

Some contract for two gradings: (a) All stock 3½ in. and smaller, including nubbins; (b) all stock larger than 3½ in., including nubbins.

Still others assort the green cucumbers by machine as they are brought to the receiving stations, and pay the growers according to the machine gradings. This is general practice where the salters desire the fine or small size cucumbers, and accordingly pay the growers a sufficiently high price to induce them to pick the very small sizes.

In these two, three or four broad gradings will be found the pickles that must be assorted later by hand or machine for sale in the individual sizes already enumerated. Each size has a different resale price, with the cost of labor involved in sorting the sizes a considerable factor in determining these resale prices.

In hand assorting stock, each pickle, whether it be the 600 or the 20,000 size, must be individually handled on a conveyor belt. In other words, in sorting a barrel of 20,000 size, the sorters must handle 33 times the number of individual pickles handled in sorting a barrel of the 600 size. Hand-assorted salt stock may be offered on the market at prices ranging from $1 per bu. for the large size to $5 per bu. for midget sizes.

No doubt there are as many different methods and systems for working out costs and selling values as there are different individuals and concerns. But if there is any uniform system or any published work on this problem of cost accounting, it has escaped the notice of the writer.

The system in use in our plant is neither unique nor original. It is presented here because the writer believes that proper and uniform accounting methods do present a problem which must some day be faced by the manufacturer and salter. The writer has attempted by use of simple illustrations to give the idea of the method used in his plant.

Consider a case involving four sizes of machine assorted vat-runs. The salter knows his cost of green stock; he has kept accurate records of his salting expense such as labor and salt used; and figures his cost of machine assorting at 15c. per 100 lb., or 7½ c. a bu. After machine assorting a tank of stock, he

Hand assorting salt stock in the plant of Fleishman's Pickles, Inc. This is part of the cost that must be correctly allocated to the finished product in order to obtain a true cost figure.

finds 240 bu. of size A; 150 bu. of size B; 120 bu. of size C; and 90 bu. of size D, a total of 600 bushels.

Inquiry reveals that machine assorted stock of the above sizes is being sold at $1.50 per bu. for size A; $1.75 per bu. for size B; $2.25 per bu. for size C; and $3.00 per bu. for size D. Suppose he finds a ready market for size A and size D, but demand lacking for sizes B and C. At what price should he figure his cost on each of the sizes, and how should he value his inventory of unsold sizes at the end of the year? It must be obvious that the cost assigned to each of these sizes must bear some relation to the current market price.

The cost data known to the salter are these:

	Per 100 lb.
Price paid for green stock	$1.75
Handling and salting	.70
Machine assorting	.15
Cost of salt stock, machine assorted	$2.60 per cwt. or $1.30 per bu.

He knows that, after machine assorting his tank, he had on hand 240 bu. of A, 150 bu. of B, 120 bu. of C, and 90 bu. of D, a total of 600 bushels.

Setting up this information in column form we have Table I.

Columns, 1, 2, and 3 of Table I merely list the information the salter knows and that is given in the illustration.

Column 4. *Points per size.* This figure is obtained by multiplying the percentage of each size by the market value of that size (Column 2 x Column 3). This *weights* each size according to the market value, and gives effect to the proportionate scale of values established, as well as the percentage of each size present. The total for the points of the different sizes represents the points per bushel.

Column 5. *Value per point.* This is the *cost price per bushel,* divided by the *total points per bushel,* (Cost ÷ Column 4.) In this case, $1.30 divided by 193¾ points shows a value of $0.67 per point.

Column 6. *Cost of Part Bushel.* This is the product of *points per size,* and *value per point* (Column 4 x Column 5). This figure establishes the cost for that *fractional* part of the bushel of the *assorted* stock contained in one bushel of the vat-run stock.

Column 7. *Cost of One Bushel Assorted.* This is the figure we have been seeking right along, and is obtained by dividing the *Cost of a part bushel* by the *percentage in the lot* (Column 6 ÷ Column 2).

These figures now show Mr. Salter a cost price of $1.00, $1.17, $1.50 and $2.00 for the sizes A, B, C, D, respectively. The cost figures are based on the relative selling prices of the different sizes, and on the percentage of each size present in the lot. Size C, for instance, has a market value 1.5 times that of A, (2.25 to $1.50); and its cost price is in the same proportion, $1.50 to $1.00.

At first glance the procedure used may seem to be involved; but if the reader will go over it again, he will realize that the entire method is one of simple, arithmetical calculation. Column 4, *points per size,* is really the essence of the solution. In this column, by multiplying the percentage of the size present by the market value, we accomplish the purpose of assigning to that size its just weight or share of the cost, giving effect to the two factors which determine that weight. Once we have established the number of points for each size, and the *Total Points,* the other figures naturally fall into place. *Cost of One Bushel* divided by *Total Points* yields a value of one point; *Cost of Part Bushel* follows from this as a product of Column 4 and 5; and *Cost of One Bushel* is readily seen as Column 6 divided by Column 2.

One more hypothetical case developed in greater detail, shown in Table II should clearly establish the procedure followed. The XYZ Pickle Co. has been offered a car of field-run salt stock at

Table I

1	2	3	4	5	6	7
Size	% in lot	Market value	Points per size	Value per point	Cost of part bu.	Cost of one bu. assorted
A-240 bu.	40	$1.50	60		$0.402	$1.00
B-150 bu.	25	1.75	43¾	$1.30 cost / 193¾	0.293	1.17
C-120 bu.	20	2.25	45	equals $0.67	0.302	1.50
D-90 bu.	15	3.00	45	per point	0.302	2.00
600 bu.			193¾ Total points		$1.30	

Assorting by machine is faster and involves less labor than hand assorting, but still enters importantly into the cost of the finished product as is pointed out in the text of the article

$1.60 per bushel; and a careful analysis of a sample barrel shows the sizes and percentages in the lot as listed in Table II. In this case, the market values established for the individual sizes are clearly intended as hypothetical values, and not as expressions of the current market price.

Also, desiring to show the method of calculation as easily as possible, the writer has eliminated from these figures any charge for hand assorting the stock. Thus Column 7 will reflect the cost of the pickles only; and due allowance will have to be made by each firm for adding its established hand assorting charge.

If we were to assume for a moment that the market values and cost price of $1.60 per bushel for the field-run stock were true representations of the salt stock market, in other words, the hand assorted sizes were actually being quoted at prices given in Column 7, the XYZ Pickle Co. could readily see from these figures that the field-run stock was priced too high at $1.60 a bushel. It would be more advantageous to buy hand assorted stock. The method outlined therefore also serves as an aid to buyers in determining at any time whether it is more profitable to buy hand assorted stock, or to buy the mixed sizes and do their own sorting. Inasmuch as a five or six bushel sample is usually representative of the lot, it is a simple matter to assort the sample and make the cost allocations and comparisons.

Some objections may be raised against basing the cost prices on current selling prices, as frequent changes in market conditions would necessitate revision of calculations. This difficulty can be overcome by the method used by one of the large pickle companies. Some nine or ten years ago the writer described the "point method" to the cost department of this organization, and they put it into practice. But instead of relying on current market prices or quotations, this cost department evolved a scale of relative values for all sizes from 400 to 30,000. Basing the values of the 400 size at 1, they gave the 600's a value of, say, 1.1; the 800's, 1.2; the 1,000's, 1.25; and so on through the complete range of sizes.

About two months ago one of the executives of this company called on us, and during the conversation he disclosed that they are still using the same cost method; and more than that, they have made no change whatsoever from the original scale or chart of relative values adopted nine years ago.

While the market price of stock changes frequently, the relative values of the different sizes to each other remain fairly stable. It is conceivable that, due to a combination of circumstances involving growing conditions and changes in demand, there may be a radical shift in comparative values. For instance, growers may pick an unusually heavy percentage of the fines or small sizes, and a light percentage of the larger sizes. The demand that season may be very strong for the 800 to 1,200 sizes, with buyers bidding unusually high for them. In such an unusual instance, it would become necessary to bring the different sizes into truer relationship to each other by revising the scale previously adopted. This, however, is an infrequent occurrence.

The method described in this paper is offered not as the final word in cost determination; but rather as a procedure simple in operation and conforming to sound accounting practice.

Table II

1	2	3	4	5	6	7
Size	% in lot	Market value	Points per size	Value per point	Cost of part bu.	Cost of one bu. assorted
6/800	15	$1.25	18.75	Cost of a bushel	$0.178	$1.19
10/1500	18	1.40	25.20		.24	1.33
18/2400	17	1.55	26.35	$1.60	.25	1.47
				168.35		
30/3600	10	1.85	18.5		.176	1.76
40/4500	8	2.05	16.4	equals	.156	1.95
50/6000	6	2.30	13.8	$.95 per point	.131	2.18
70/8000	5	2.50	12.5		.119	2.38
9/10,000	5	3.10	15.6		.148	2.96
12/15,000	3	3.75	11.25		.107	3.57
20,000	2	5.00	10		.095	4.75
			168.35 Total points		$1.60	

Use of Dry Sugar in Sweetening Foods Canned in Sirup

Part II—Bacteriological aspects. Decrease in lethal value of sterilizing process results from use of dry sugar in packing sweet potatoes

By O. G. BRAUN, G. L. HAYS and H. A. BENJAMIN, *Research Department, American Can Co., Maywood, Ill.**

AS previously stated, spoilage has been encountered in packs of sweet potatoes to which dry sugar had been added and which had been given processes considered adequate to insure commercial sterility. The thermal resistance of the spores of the spoilage organism when suspended in neutral phosphate buffer was considered inadequate for these bacteria to have survived the process employed. However, after the zoning effect in processed cans of sweet potatoes to which dry sugar had been added to the can had been observed, the thermal resistance of spores of several types of microorganisms was studied in concentrated sugar solutions. Increased thermal death times were observed in all of the preliminary thermal death time studies.

The heat-protective action of sugar solutions upon bacteria has been recognized for the past decade as an important factor in the pasteurization of certain dairy products. Oldenbauch, Frobisher and Shrader;[11] Fabian and Coulter;[8] and Anzulovic[1] all have demonstrated that several strains of non-spore-forming microorganisms have increased thermal resistance in ice cream mix. Fabian and Coulter were unable to show any marked protective effect with any of the ingredients of ice cream except sucrose.

Beavens[6] reported that 4 to 20 percent lactose in broth increased the resistance of *Escherichia coli.* Baumgartner and Wallace[5] found that 10 percent sucrose solutions afford appreciable protection to *Es. coli* at pasteurization temperatures in neutral solutions.

Rahn[12] stated that long ago he had observed that "sugar not only retards growth of yeast and other microorganisms, but also retards the action of heat upon microorganisms; it will take more heat to kill a bacterium or yeast in a sweetened fruit juice than in the same juice without sugar." He found that yeast cells suspended in a raisin extract to which various sugar concentrations had been added increased in resistance with the increase in sugar concentration. He points out that this increase in resistance probably applies to the canning of all foods, especially fruits, to which sugar is added if the product is processed before the sugar has had time to become diluted by penetration into the fruit.

Weiss[14] found that the resistance of spores of *Cl. botulinum* in the juice of fruits of almost equal pH values showed differences of 10 to 20 minutes. He states, "This difference is apparently due in most cases to the concentration of sirup present in the product, the greater the concentration of sirup the longer the period of exposure required."

Wallace and Tanner[13] suspended several species of molds in 10, 25 and 50 percent solutions. A protective action was afforded by the sugar solutions to some of the molds but had an opposite effect on others.

Fay[9] showed that the protective action of a given sugar increased with the increase in osmotic pressure, but equimolal solutions of different sugars did not show the same protective action. The phenomenon of increased thermal resistance could not be demonstrated with all the cells studied.

Beilinsson,[7] Bancroft and Richter,[3] Bancroft and Rutzler[4] and Fay[9] have all demonstrated that the addition of sufficient sucrose to egg white will render this albumin stable to temperatures in excess of the usual coagulation point. Fay has suggested that the protective action afforded by certain sugars is due to retardation of the agglomerating action of heat on the protoplasmic colloids. Thus, cells subjected to a given heat treatment in certain sugar solutions are only reversibly coagulated, whereas in aqueous suspensions the protoplasm approaches the irreversible stage of coagulation. Rahn[12] stated that in the more concentrated sugar solutions, less moisture is available for the microorganism. In high sugar concentrations the cells are almost dry, and dry organisms are much more resistant to heat than are moist cells.

Experimental Procedure

To check the effect of various concentrations of sugar on the thermal resistance of some of the common canned food spoilage bacteria, the following tests were made.

Cultures of organism 1518 (*B. stearothermophilus* Donk) and a thermophilic organism capable of forming flat sours, which had been isolated from spoiled sweet potatoes, were inoculated on plain agar slants and incubated for 72 hours at 131 deg. F. The slants were then placed in the refrigerator at 40 deg. F. for a period of 2 to 6 days. In addition, an aerobic spore-forming organism, isolated from evaporated milk, was also inoculated on plain agar slants and incubated at 98 deg. F. for three days. The cultures were then placed at 75 deg. F. for one day and at 40 deg. F. for two days.

The growth was removed from several slants of each of the above aerobic cultures in a minimum of sterile phosphate buffer and these suspensions shaken vigorously to break up clumps of spores. Equal portions of these spore suspensions and equal portions of stock spore suspensions of several strains of putrefactive anaerobes, a thermophilic anaerobe and *Clostridium botulinum* (Type A) were inoculated individually into a given volume of sterile neutral phosphate buffer and into the same volume of 15, 30, 50 and 70 percent sirups prepared from certified canners' sugar.

* Paper presented at convention of National Canners Association in Chicago the week of January 19. Part I was published in February, page 47.

After inoculation, the 50 and 70 percent sugar solutions were placed in a 160-deg. F. water bath for about 10 minutes so that the solution would be less viscous and thus facilitate shaking. All of the suspensions were then agitated in a shaking machine to insure an even distribution of spores throughout the solution.

One milliliter portions of the inoculated solutions were pipetted into Pyrex tubes having 1-mm. walls and a 9-mm. outside diameter. The open ends of the tubes were sealed in a flame and the sealed tubes heated for various intervals at 230, 240, or 250 deg. F. in a thermal death time unit. This unit, shown in Fig. 1, consists of six cast cylindrical chambers, approximately 6 in. in diameter by 9 in. high, equipped with individual thermometers, drains and quick-action water and steam valves. These chambers are connected to a large retort, the temperature of which is automatically controlled. The individual units are brought up to operating temperature in about 10 to 15 seconds.

After heating, the contents of the thermal death time tubes of the flat sour suspensions were cultured in dextrose-tryptone agar while the thermophilic and putrefactive anaerobes were cultured in liver infusion broth tubes stratified with plain sugar. The mesophilic aerobe was cultured on plain agar. The data obtained are summarized in Table V.

It will be noted from the table that with the exception of the putrefactive types, a general correlation was observed between the thermal death time of the organisms studied and the sucrose concentration of the suspension media. A marked increase in the thermal death time was noted for all of the spores heated in 70 percent sucrose solution when compared with the times observed in the lesser concentrations. This was especially noticeable in the thermophilic organisms studied. The putrefactive anaerobes apparently were not similarly affected in solutions of 50 per cent concentration or lower.

This apparent increase in heat resistance with increased concentrations of sucrose might be assumed to be due to a decrease in heat penetration into the more dense sirups. However, calculations based on heat-penetration data observed in products such as cream style corn or heavy starch solutions show that 1.84 minutes would be required to bring the center of a 7-mm. thermal death time tube from 70 deg. to 240 deg. F., assuming only conduction heating to occur. Under this extreme condition of retarded heat penetration into the thermal death time tube, a correction factor of only 0.9 minutes would have to be applied to observations based on the assumption of instantaneous heating of the tube to 240 deg. F. The fact, as previously noted, that correlation between the thermal death time and the sirup density was not observed for all of the types of organisms studied would further indicate that the rate of heat penetration into the various tubes was not a factor in this instance.

Table V—Results of Thermal Death Time Studies.

Code	Description	Concentration (spores/ml.)	Temp. (°F.)	Maximum survival time in solutions of Phosphate (pH 7) (min.)	15% Sugar (min.)	30% Sugar (min.)	50% Sugar (min.)	70% Sugar (min.)
1518	B. Stearothermophilus Donk	140,000–160,000	250	28	42	40	55	90
1518	B. Stearothermophilus Donk	201,000–238,000	250	34	38	42	55	90
28 *U*	Flat sour from sweet potatoes	1,900–4,000	240	5	3	5	7	35
66K	Thermophilic anaerobe	1000,000	250	8	6	7	12	40
18 *U*	Aerobic spore former	59,000–101,000	250	4	3	5	7	35
3679	Putrefactive anaerobe	100,000	250	6	1	1	1	3
3679	Putrefactive anaerobe	100,000	250	5	1	1	2	4
55*T*	Putrefactive anaerobe	100,000	250	3	1	1	1	3
19*A*	*Cl. botulinum* (Type A)	120,000	230	5	1	2	2	10

Summary

1. In a procedure for canning sweet potatoes wherein the sugar is added in dry form followed by filling the can with water, a considerable portion of the dry sugar added has been shown to remain undissolved during the subsequent thermal process. The density of the sirup in such cans after the process has been found to increase from the top to the bottom of the can, with that immediately above the undissolved sugar in the bottom being at the saturation point.

2. The thermal death times of certain canned food spoilage organisms have been shown to vary directly with increasing concentration of sugar solutions in which the organisms are heated. This increase in thermal death time is especially marked in sugar solutions which approach saturation.

3. A 32 percent decrease in lethal value of sterilizing process of 70 min. at 240 deg. F. has been found to be effected by the use of dry sugar in packing sweet potatoes, as compared to the similar process on cans to which the sugar had been added in sirup form.

4. The combination of these factors makes the addition of dry sugar to canned sweet potatoes without subsequent agitation extremely hazardous.

Acknowledgment

The authors acknowledge the help and direction given by Messrs. R. H. Lueck and R. W. Pilcher during the course of this study.

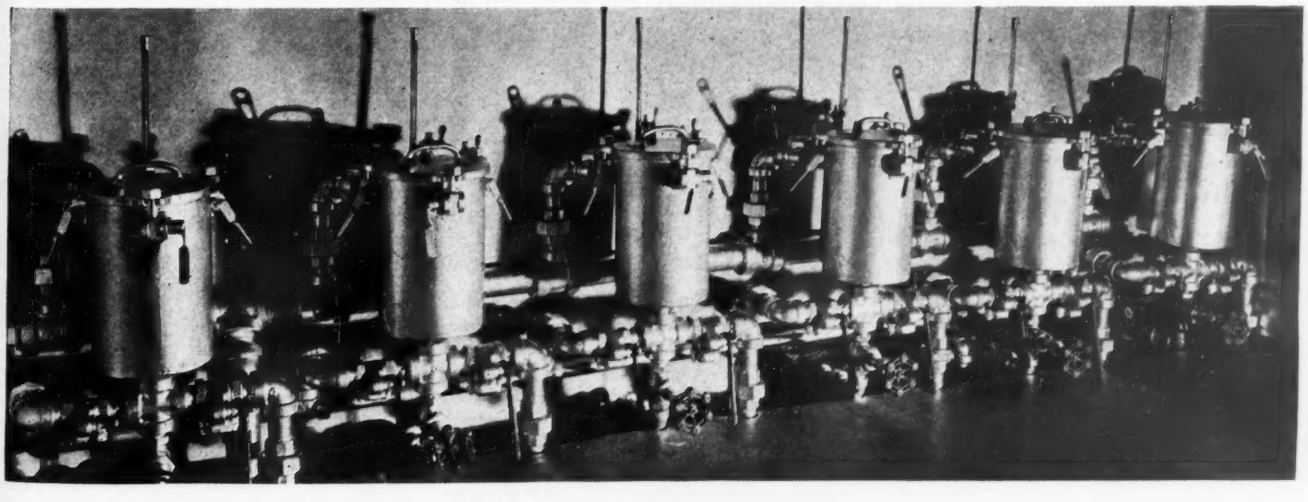


Fig. 1. Thermal death time apparatus.

Hints and Hurdles

Quality Commands Premium, Canadian Experience Shows

MAJOR H. G. L. STRANGE, Winnipeg, Canada, director of the crop testing plan of Canada, recently addressed an informal group of farm and wheat improvement leaders, stating that: "In 12 years' time through the simple expedient of licensing wheat varieties, the quality of Western Canadian wheat has increased so greatly that today it commands a premium of ten cents on the world's market and is the only wheat in the world purchased in the major markets on paper without substantiating tests."

Major Strange further commented that: "Probably no people in the world hate government supervision and meddling government inspectors more than do we Canadians. But I say in good faith that today if the government would announce that it no longer was going to license wheat varieties the farmers of the Western plains would march on Ottawa and burn the Parliament Buildings. Before the wheat licensing plan went into effect, Canada was producing 38 different varieties of wheat, plus uncountable mixtures. Flour millers and bakers in England, Switzerland, France, Germany and Italy began to complain so loudly that measures were taken to check the production of the inferior varieties. Now Western Canadians realize that they live by wheat and wheat alone and that they must produce that wheat for the market. If buyers are not satisfied, then changes have to be made. The crop testing plan and the licensing of wheat varieties have made it possible to please the buyers more than they have ever been pleased before by any wheat growing nation in the world."

In view of recent developments in the United States, there may be a worthwhile idea in the above for manufacturers here.

It's Give and Take

IN MOST MILK SHEDS throughout the country, the volume of fluid milk consumed varies indirectly with the price per quart. The New York City market is no exception.

When the Federal Milk Market Order set the price of fluid milk to the farmers supplying New York City, it provided a better income to farmers in the sheds than they had enjoyed for years. Farmers' profits depend on total volume; therefore, farmers have increased their herds and the output of milk. That was one result of the F.M.M.O. The order not only fixed the price to farmers but also put a floor under the price to consumers. Result: Increasing surplus of fluid milk.

The U. S. Department of Agriculture and city and state departments of welfare have attempted to move the surpluses through a plan to provide free milk to families on home relief and through the offer of subsidized "penny-a-glass-milk" to public school pupils. At present in New York City "penny-a-glass-milk" is available in public schools with an enrollment of 491,808 pupils.

Strange antics: Government creates a surplus, then subsidizes consumption of the surplus. Good for the dairy farmers and the "penny-a-glass-milk" drinkers. Tough on the cows and the taxpayers.

Significance of U. S. Grades

THE OUTCOME of the "experiment" in continuous inspection and "U. S." grading of canned foods, conducted so far by AMS in 6 canning plants, will be very important to other food manufacturers as well as canners. FOOD INDUSTRIES in this issue, page 51, presents information to aid food manufacturers to determine the significance of this development. More will follow in later issues.

The B Vitamins in MEAT
VITAMIN B GROUP
PORK 1602 344 11.0
BEEF 227 294 8.4
LAMB 337 397
VEAL 310 414 16.2
LIVER 389 3343 35.5
FANCY MEATS
MEAT IS A RICH NATURAL SOURCE OF B GROUP VITAMINS

Fortification of processed foods with vitamins and minerals is the present popular urge. Milk, candy, dog food, cereals and wheat flour, among other products, have been or are being fortified. Improved food values have been widely advertised. Meat, ill suited to fortification, has belatedly discovered its inherent nutritional values and backs its claims with the seal of the A.M.A.

Evidence of Understanding Betters Public Relations

REPEATED WARNINGS have been issued from the platforms of business and industry association meetings, stressing the need for improved employee, stockholder and public relations. Too often industry's predicament and the way out has been presented in such foggy generalities that the whole industrial and public relations issue has seemed hopelessly complex and confused. To add to the confusion, insistent editorials have appeared in the business press, attempting to goad industry into reforming, taking the pledge and hereafter leading a better life.

Whether because of this well-intentioned advice or not, some businesses have done a first-rate job of getting "right" in the world in which they live. Others have felt their own pulse, admitted they were sick and turned the whole matter over to the doctors.

Probably one of the first business "sins" to be admonished was the high-hat financial statement legible only to a few accountants and Wall Street brokers. Or is that an exaggeration? Financial statements which make horse sense to the layman are now replacing statements issued exclusively for those "in the know." Result: confidence is replacing suspicion. The foundation on which improved relations are built is simple, at least in its element—as simple as bricks.

In the drive for improved relations, two groups have often been given little attention. These are the producers and the distributors. Improving relations with producers and distributors is just as essential and often as simple as improving relations with either of the other groups.

Boston's Atlantic Coast Fisheries mailed this year's simplified horse-sense financial statement to all its distributors and prospective distributors, as well as to stockholders—a simple gesture and an inexpensive one. Result: Better understanding, improved relations, upped sales.

Recognition is gratifying—who doesn't like to be noticed? Good will results, also confidence in the company and the company's products.

12 Causes of Springers in Cans

Incipient spoilage relatively unimportant as cause of springer formation. Errors of packaging meat products in cans commonest cause of trouble. Easy to overcome by proper vigilance

By G. V. HALLMAN,* *Research Department, Continental Can Co., Chicago, Ill.*

WHILE it is impossible to determine the condition of the contents of a can except by an examination after the can is opened, there are certain aspects of the exterior of an hermetically sealed processed can which may determine its merchantability. One of the most important of these is that the ends must have either a flat or concave position. Purchasers are suspicious, and rightly so, of cans the ends of which are not normal in this respect. Even though the contents may be in good condition, the lack of vacuum in the can or the presence of pressure may cause rejections, financial losses and loss of future business.

If the pressure in the interior of a can is slightly greater than the external or atmospheric pressure, one end may spring out. In the canning industry in general a "springer" is a can one end of which is slightly bulged, and when this end is forced in, the other is pushed out. A "flipper" is a can one end of which becomes bulged on percussion but which, when pushed in, remains flat. In the meat canning industry these latter cans are also frequently called "springers."

Information on the causes of springers in canned meats is helpful in assisting canners to prevent them. In some instances, only one factor is the cause, but more frequently, springers occur as the result of a combination of conditions. Sometimes in the usual canning procedure which gives satisfactory results, one or more of these conditions may be present, but an additional contributing factor may cause springers. The last factor is usually blamed, but it may be really only one of several conditions which, when combined, are responsible. Thus, contributing factors of greater magnitude may be overlooked while minor changes in canning procedures are made to temporarily overcome the difficulty. To prevent cans from becoming springers, it is advisable to determine and eliminate all of the factors contributing to that condition. The following is a list of the more important factors causing springers in canned meats:

G. V. HALLMAN

1. Overfilling of the can.
2. Low closing temperature of product when can is exhausted by heat.
3. Insufficient vacuum when this is obtained by mechanical means.
4. Delay between closure and processing of cans.
5. Incipient spoilage of product.
6. Leakage of can.
7. Excessive distortion of can ends during processing.
8. Rough handling and denting of can.
9. Changes in altitude and temperature of storage.
10. Type of ends.
11. Chemical reaction between ingredients of product.
12. Chemical reaction between product and can.

Some of these factors apply to canned meats in general, while some of them apply only to specific items of canned meat products.

Overfilling

Overfilling is one of the more common causes of springers in canned meats. A can is overfilled when the volume of the contents at ordinary storage temperatures is greater than the capacity of the can with both ends flat. The following are several causes of overfilling:

1. The use of cans with less capacity than required for the normal volume of the desired weight of product.

2. The filling of a greater weight of product into the can than is intended due to improper adjustment of mechanical fillers, inaccurate check weighing scales, carelessness in check weighing or carelessness in hand filling without check weighing.

3. The trapping in the can or in the product, during filling, of gas which does not escape during exhausting, so that the normal volume of the contents of the can is increased.

4. The introduction of abnormal amounts of gas (air) into the product during mixing so that a given weight of product occupies greater volume.

5. The use of meat containing abnormal quantities of gases, resulting from bacterial growth. Such gases are in the product when the can is sealed. The gases are driven from the meat during the heat treatment of processing and are not reabsorbed by the product. These gases may increase the volume of the contents of the can so that it is overfilled.

6. Changes in the formula of the product increasing the volume occupied by a given weight. In general, decreasing the moisture content increases the volume, and increasing the fat content increases the volume.

7. Addition of too much water or brine to complete the fill of the can. In some canning lines, the fill of the can is completed with brine or water supplied continuously by a perforated pipe. When this procedure is employed, sufficient liquid should be removed from the can

* From a paper presented before the meat section of the National Canners Association Convention, Chicago, January 23.

prior to closure so that the volume of the contents of the can after cooling to normal storage temperatures does not exceed its capacity.

8. Changes in methods of preparation affecting the volume of the product. Some steps in the preparation of meat products for canning which affect their specific gravity are: Time of precooking, size of grind and methods of conveying.

9. Filling cans as full as possible. Some canners deliberately fill cans with certain products as full as possible to minimize the headspace because these products become discolored where they are adjacent to the headspace. In these instances, a slight excess of product may cause overfilling. When filling an open top can, the level of the product should be at least $\frac{1}{16}$ in. below the top of the flange of the can, unless the sealing temperature is sufficiently high to permit contraction on cooling to this headspace. The inner side of the can cover after double seaming is $\frac{1}{16}$ in. below the top of the can. Overfilling may result from filling the can to the top of the flange.

Insufficient Vacuum

Low vacuum, as a result of insufficient heat exhausting, is another factor in causing springers. Heat exhausting may be accomplished by heating the product prior to filling into the can (hot fill), or by heating the filled cans, usually in an exhaust box. One purpose of either method is to heat the product and increase the vapor pressure in the headspace when the can is closed. With canned meats, the use of higher closing temperatures results in greater vapor pressure in the headspace of the can and greater shrinkage of the product after cooling. When the closed can is cooled and the vapor pressure decreased, a partial vacuum results. The amount of vacuum in the can depends largely on the difference between the vapor pressure at the time of closure and the vapor pressure at normal storage temperatures. When atmospheric closure is employed, and the closing temperature is approximately the same as the storage temperature, there is no appreciable decrease of vapor pressure in the headspace, and the can has little, if any, vacuum. Such cans are likely to become springers. Low closing temperatures are likely to result from the following procedures:

1. Insufficient heating of the product prior to filling.

2. Delays in filling the cans, or in closing filled cans, permitting product to cool.

3. Insufficient time of exhaust for filled cans.

4. Not turning on steam to exhaust box or not operating exhaust box at intended temperature.

5. Using same time of exhaust for different products requiring different times of exhaust.

6. Delays between exhaust box and closing machine.

7. Allowing heated product to stand and cool during a shutdown such as lunch hour.

8. Determining closing temperature by feeling can instead of using a thermometer.

Cans closed under mechanical vacuum may also become springers due to low vacuum. The principle involved is the withdrawal of air and gases from the headspace of the can by vacuum and hermetically sealing the can under vacuum. Low vacuum in cans closed under vacuum may result from the following:

1. Low vacuum or no vacuum in vacuum closing machine.

2. Insufficient headspace. In order to remove gases from the headspace, it is necessary that a headspace be present in the can. Each can should have at least $\frac{1}{4}$ in. net headspace for vacuum closure.

3. Cover clinched too tight on the can. If the cover is clinched on the can too tightly, there may not be sufficient opening available for the removal of the air in the allotted time.

4. Vents closed by expansion of the product. Products containing gas, as mentioned above under overfilling, expand when subjected to vacuum. This expansion of the product may plug the vent hole or the space between the can body and the clinched cover. This may interfere with the removal of the air from the headspace of the container and cause low vacuum.

Prolonged holding of closed cans prior to processing may result in incipient spoilage of the product and springers. The incipient spoilage, accompanied by gas production, has the same effect as overfilling because the gas evolved increases the volume of the contents of the cans. Incipient spoilage is most likely to occur in products held at temperatures favorable for bacterial growth (75 to 98 deg. F.).

Springers in canned meats may be the result of spoilage of the product. Normally cans of spoiled meat become hard swells with both ends so distended that they strongly resist being forced in. However, cans pass through the springer stage before becoming hard swells. The springer stage may be prolonged if the growth of the spoilage bacteria is retarded due to: (1) The presence of curing materials. (2) The low moisture content of the product. (3) Adverse temperature conditions such as storage under refrigeration.

Imperfect closure of the cans may be a cause of springers. However, if the can is not hermetically sealed and leakage occurs, the contents usually spoil and the can becomes a swell. Under certain conditions of can closure, air alone may enter the can. This results in loss of vacuum, and springers. Such cans are frequently called "breathers."

When the ends of the can are distorted (buckled) and stressed during processing in the retort so that the can ends do not return to the normal flat or concave position on cooling, the condition of the ends of the can is abnormal. Sometimes in the meat canning industry such cans which show excessive distortion are called springers. This condition of the can results from excessive internal pressure within the can at the end of the process or after processing and before cooling. Some conditions causing distorted ends due to excessive pressures within the can are:

1. Overfilling the can.
2. Low vacuum in the can.
3. Gas in the product.
4. Excessively high processing temperatures.
5. Improper methods of cooling processed cans.
6. Improper procedure for cooling processed cans under pressure.

Causes of Dented Cans

Springers may also result from denting or jamming cans. A dent or jam may decrease the capacity of the can so that the product may exert sufficient pressure against the ends to force them from their normal flat or concave position. Low-vacuum cans and cans filled completely full are more likely to become springers due to dents or jams. Probably most of the denting and jamming of cans occurs during one of the following operations while they are in retort crates or trucks:

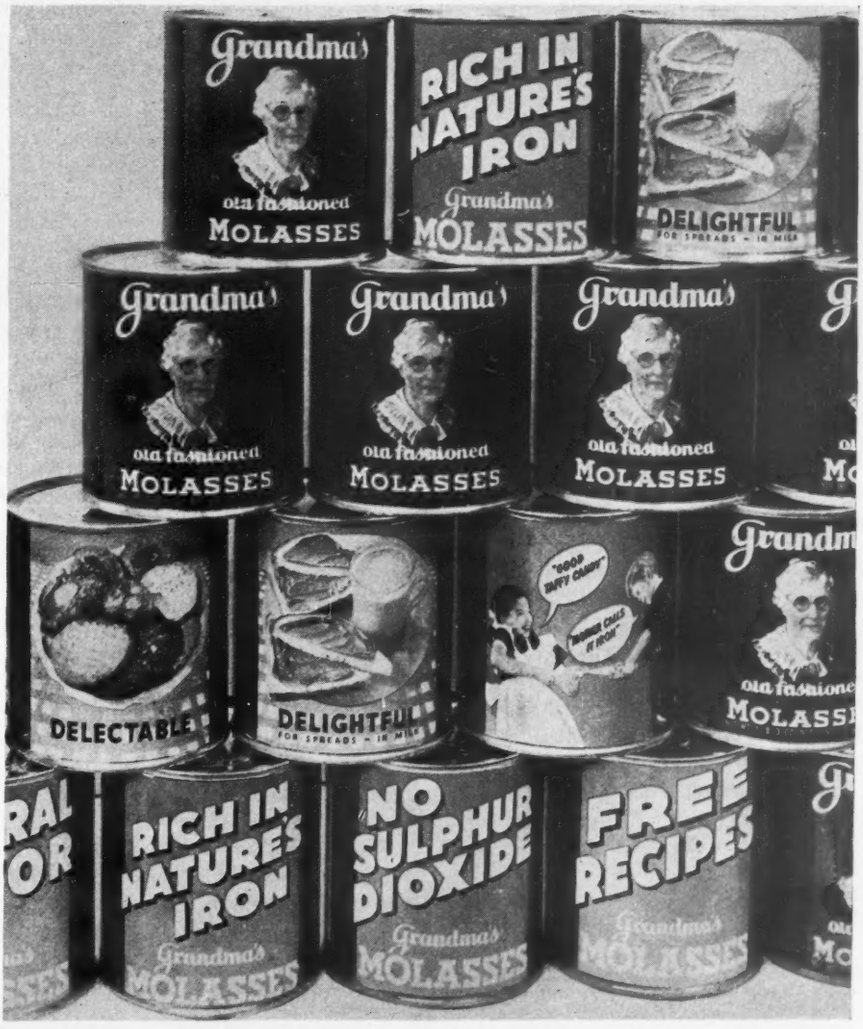
1. Allowing cans to fall on other cans in the retort crate or truck.
2. Wedging cans tightly into retort crates.
3. Placing cans in retort crates without allowing space for the lowering of handles, bars and so forth.
4. Rough handling of retort crates or trucks when filled with cans.
5. Cans falling against each other when retort crates or trucks are dumped.
6. Placing filled retort crates on other crates having cans extending above their tops.

Part II of this article, completing the discussion of the causes of springers, will be published in April.—EDITORS.

New Packages & Products

Self-Service Label

AMERICAN MOLASSES Co., New York, has recently introduced an innovation on the label of its product, "Grandma's Old Fashioned Molasses." The new label was designed especially to increase sales in self-service stores. The labels on an assortment of 12 cans vary from each other. The front panel, the same on all cans, carries the trademark; the two side panels vary. These side panels carry full-color photographs of different dishes made with molasses, selling copy and an offer for free recipes. This device offers the possibility of testing a variety of labels as well as increasing the display values of the package in self-service stores.



Standard Jam Jar for Army

A NEW GLASS CONTAINER for jams, jellies and preserves, designed especially as a container for products packed for Army use, has been adopted by National Preservers Association. The new light-weight jar is designed to conserve space in shipment and storage. The contour of the shoulders permits easy access to the contents, a curved bottom facilitates emptying and a screw cap permits resealing.

This jar is to be a stock 2-lb. container for the preserving industry. Therefore, some preservers have indicated an intention to use the jar for commercial pack as well as for the Army.

ONE PINT
Lettuce Leaf
OLIVE INFUSED
SALAD OIL
PURE CORN OIL PREPARED WITH SELECTED OLIVES TO DEVELOP FINE OLIVE AROMA AND FLAVOR
THE QUAKER OATS COMPANY
CHICAGO, U. S. A.

Corn-Olive Salad Oil

"LETTUCE LEAF," olive-infused salad oil, product of Quaker Oats Co., Chicago, has just been introduced to the market. This product is made by imparting the flavor and aroma of olives to corn oil by a process of infusion. With this process, a small quantity of olives imparts the characteristic flavor and aroma of olives to a large quantity of corn oil, producing an olive-flavored oil at relatively low cost (FOOD INDUSTRIES, November, 1940, page 49). Corn oil infused with olive flavor and aroma is high in vitamin A. Because the meat of the olive contains anti-oxidants which are incorporated into the oil during the infusion, the keeping quality of the salad oil is increased as much as three times.

So They Bought C.O.E. Trucks

A Minneapolis food concern decided that it was cheaper to own than to rent trucks. So it bought its own, and operates them at $90 less per month per truck than the former rental. But when it bought the trucks it had unrestricted choice of types. Why it selected cab-over-engine units is explained in this article.

WHEN C. B. Jordan, President of the Jordan Stevens Co., wholesale grocers in Minneapolis, Minn., decided to replace rented trucks by company-owned units, he had an unrestricted choice of the type of new trucks to buy and chose cab-over-engine models for all city deliveries.

And therein are two stories of interest and value to others in the food field, the first as to why cab-over-engine models were selected and the second as to why company-owned trucks were found more economical than hired trucks.

Cab-over-engine models of International Harvester Co. make were selected because of their easy handling in narrow alleys and streets, their shorter overall length with the same length of body as used on conventional models and their greater maneuvering ability in all congested areas.

One such truck was purchased and kept in service for more than a year before other units of the same type were added. The first truck gave such excellent service in every respect that eight more trucks of the same model and make were purchased.

The Jordan Stevens present fleet, which is standardized on Internationals, consists of nine C.O.E. (cab-over-engine) 1½-ton trucks, one 3-ton conventional truck and one tractor-trailer combination. The C.O.E.'s are used for city and nearby suburban deliveries, the 3-tonner mostly for hauling inbound freight shipments and the tractor-trailer for the longer country runs with heavier loads.

The bodies mounted on the new C.O.E.'s have had a lot to do with their successful operation. Before the orders for the bodies were given, the Jordan Stevens drivers were consulted as to body width, length and height; cab roominess; side and rear openings, and other details.

Those features of construction which the drivers said would make their work easier were incorporated in the new bodies shown in the illustrations on these two pages. This was good business on the part of the Jordan Stevens company because when a truck driver can do his work easier, he also does it better and does more of it, both essentials in keeping customers and reducing route delivery costs.

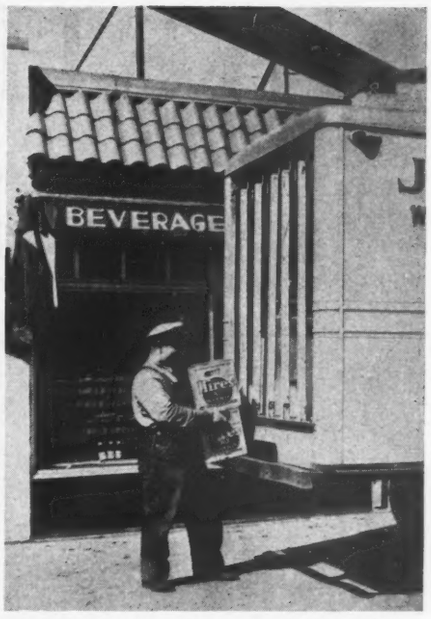
Prior to 1939, the Jordan Stevens company handled dry groceries, coffees and teas exclusively. However, in that year the company installed a battery of refrigerating rooms, including several banana rooms of the most modern design and construction.

With these new refrigerating facilities available, the company expanded its business to include the sale and distribution of a complete line of fresh fruits and vegetables. To assure the delivery of these perishable goods in good condition at all times of the year, a different body construction was required as compared with that for ordinary dry groceries.

As a result, the bodies on the new C.O.E.'s are of two different types of construction, one for dry groceries and the other for perishables. Both types are of the panel type. That for the perishable goods is insulated and completely closed with rear doors while that for the dry groceries is lined but not insulated and has an open rear end.

All the bodies mounted on the Model D-300 International C.O.E.'s have inside dimensions of 12 ft. in length, 7 ft. in width and 6 ft. in height. Six of the bodies have 60-in. wide, open rear ends with removable stakes and roll curtains and 36-in. side doors on the curb side. One body has the same rear-end construction but in place of the side door

Three of the nine new cab-over-engine, 1½-ton Internationals purchased by the Jordan Stevens Co., Minneapolis, Minn., for city food deliveries. The larger International shown in the right background is employed for hauling inbound freight shipments. The new C.O.E. model Internationals have proven most satisfactory because of their greater maneuverability and less overall length as compared with conventional models of the same capacity. Side body doors and open rear ends also help to speed up deliveries. The Jordan Stevens loading platform is shown at the left background.



At the left, a close-up showing how side body doors on one of the new cab-over-engine Internationals helps to speed up deliveries by the truck's driver. The panel body protects the load against rain or snow. All the trucks in the Jordan Stevens fleet are painted in a uniform design. The cabs and running gear are a rich maroon, with the front fenders black. The body itself is cream with red and green lettering. Each body carries a plate, just discernible in the above view, at the lower right front end bearing the driver's name. At the right, the open rear end of the body with removable stakes and the channel bumper to protect the body when backing into the loading platforms.

has 6-ft. wide openings on each side with stakes and curtains.

All seven of the above bodies are lined with ¾-in. fir from the floor to a height of 30 in. An inside dome light, exterior marker lights, reflectors and a special ventilator-type window in the front complete the equipment.

The body panels are made from 20-gage auto steel backed with ⅜-in. composition board. All doors are hung on piano-type hinges with rubber gaskets around all edges to prevent dust infiltration and are equipped with three-point refrigerator type door locks.

The remaining two bodies are of the same width and length but are only 5 ft. high inside. These are fully insulated and have insulated side and rear doors. The two trucks with these bodies are normally used exclusively for the delivery of the company's perishable fruits and vegetables.

Two other features of all the bodies include a heavy angle-iron bumper almost flush with rear end of the floor and a driver's name plate on the outside of the body near the lower right front corner.

The former permits each truck to be backed up to the company's own loading dock and to other platforms without damaging the body and without too large a gap between the truck itself and the loading platform.

The driver's name-plate on the body instead of the cab is unusual but has the effect of making the driver feel that it is his own truck so that he will take better care of it. The name-plate cost is nominal and has paid for itself many times in the better care given the trucks.

Previous to the company's purchase of its own trucks, it had rented trucks for over 13 years on a monthly basis, with the driver and all supplies furnished. When the Jordan Stevens company sought a reduction in the rate, the trucking company claimed to be losing money and submitted a statement substantiating this loss although its business was not loaded with high salaries or unnecessary personnel.

C. B. Jordan, President of the Jordan Stevens Co., which started in the grocery business in Minneapolis, Minn., over 80 years ago. Of course, its delivery fleet is now entirely motorized. The new cab-over-engine trucks shown on these pages are the newest additions to the fleet which is standardized on Internationals.

Then on visiting the garage of the trucking company, it was found that it has 20 or 30 idle trucks. It was explained that these were used as spares and as required on special hauling jobs.

Further investigation revealed the fact that the trucking company rented very few other trucks such as those of the Jordan Stevens company which were in constant use. In other words, the trucking company was not losing money on its active equipment but on too large a ratio of spare or mostly idle trucks.

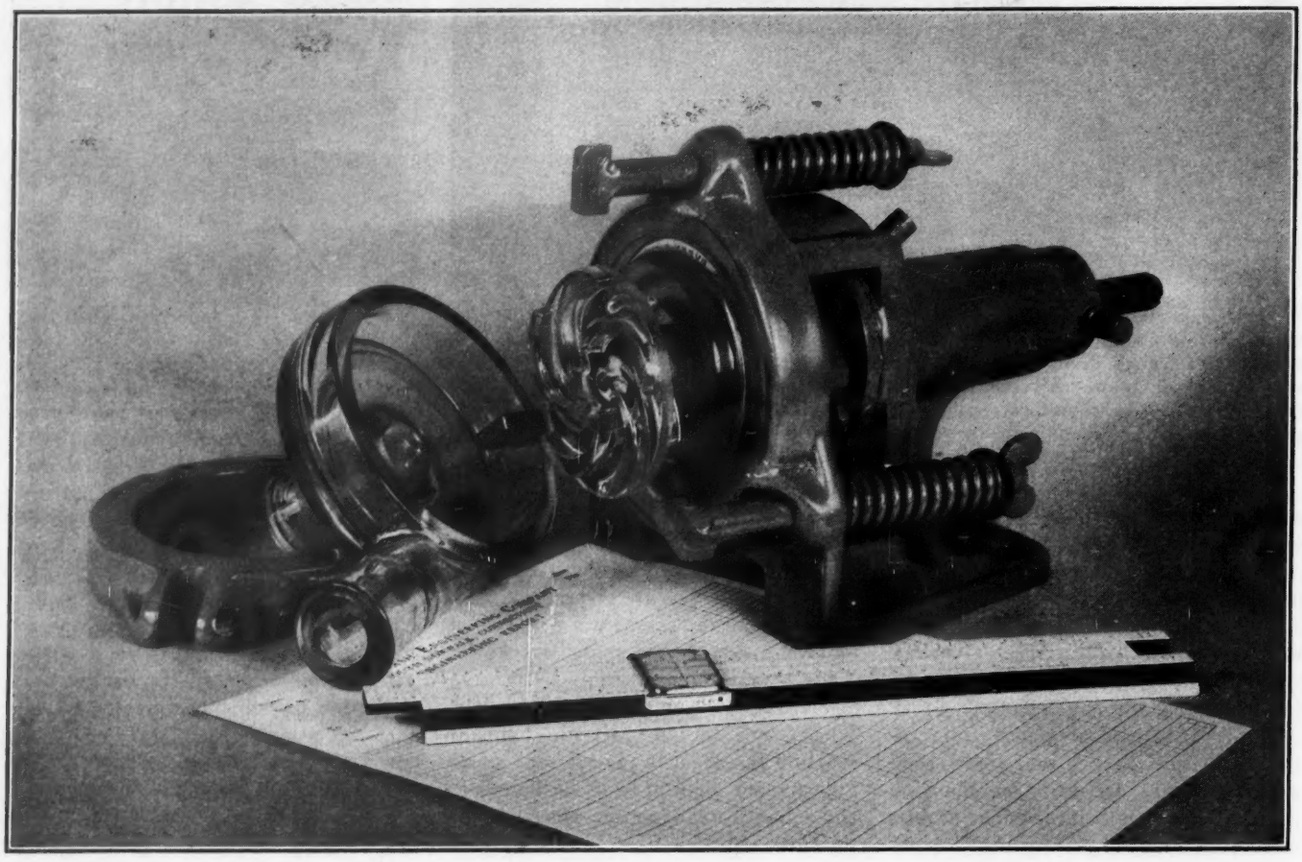
As a result, the Jordan Stevens company decided to purchase its own trucks of the type previously described. After a year's operation, the figures show that on the average, the cost of operation of the company-owned trucks is $90 less per truck per month than the rental previously paid.

Part of this saving was due to the elimination of four of the five helpers previously used on the rented trucks. With a powerful driver's union in control of the situation, it would have been quite impossible to take the helpers off the rented trucks and tell the drivers that from then on each was to do the work formerly done by two men.

But when the company purchased its new faster, lighter and lower trucks, it simply announced there would be no more helpers. And there has been none except for one such used on the most congested of the city routes.

NASH *Pump of Glass*

now *available in smaller size*



One of the most sensational developments of the past year was the Nash Pump of Glass, a 1½″ x 2″ centrifugal pump of "PYREX" brand heat and shock resisting glass, product of cooperation between Nash Engineering Co. and the Corning Glass Works.

The outstanding success of this 6000 gallon an hour pump in service immediately created a demand for a smaller size, and we now offer a ¾″ x 1″ pump with a capacity of 10 gallons per minute, ideally adapted to smaller installations, and for laboratory and pilot plant service.

Working parts of this pump, including impeller and casing, are constructed entirely of glass. It is fully transparent, and has the same advantages as the larger pump where corrosive liquids, or liquids which must be kept chemically uncontaminated, are to be handled . . . A unique mechanical seal replaces the conventional stuffing box, and a safety unloading device eliminates possibility of fracture of the glass casing. This pump will handle hot acids or brine cooled liquids with equal facility, and it offers a solution to many chemical, process, and food plant problems. Write for bulletin describing this remarkable pump in detail.

NASH ENGINEERING COMPANY

402 S. WILSON ROAD, SOUTH NORWALK, CONN.

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • MARCH, 1941

NRC's Enriched-flour Putsch Puts Industry into Confusion

Millers and bakers faced with production of product for which technical problems were not completely solved

FEBRUARY was a month of confusion in the milling, baking and allied industries. This grew out of the scramble to produce on a commercial scale the "enriched" flour and bread urged upon the millers and bakers by the National Research Council's committee on foods and nutrition in a statement on January 29. Enriched flour and bread were in the making, but the NRC action greatly accelerated the development. The millers and bakers were working out the technical problems gradually, meanwhile awaiting establishment of standards for the new flour by the Food & Drug Administration. Without standards, without processing and control details worked out, without equipment installed or even decided upon, without knowing what kind of flour was the best to fortify, without shelf-life tests and the usual steps involved in marketing a new product, millers and bakers rushed into action. The situation is by no means straightened out yet, nor will it be for weeks. And the enriched flour and bread are not generally available to consumers, nor will they be for some time.

Trade Association Act

Concurrently with NRC's statement, on January 29, announcements of the vitamin and mineral enriched flour were made by Millers National Federation and American Bakers Association. And these notices were quickly followed by explanatory bulletins from Wheat Flour Institute on the enriched flour and methods of mixing the vitamins and minerals into the flour. Bulletins on the use of the flour in bread were issued by American Institute of Baking.

According to these various statements, the additions to flour should consist of:

Required Ingredients

Vitamin B_1 (thiamin).....
1.66 mg. to 2.5 mg. per lb.
Nicotinic acid or nicotinic acid amide
6.15 mg. to 10 mg. per lb.
Iron (in elemental state).....
6.15 mg. to 24.6 mg. per lb.

Optional Ingredients

Vitamin B_2 (Riboflavin).....
1.22 mg. to 1.83 mg. per lb.
Calcium.....0.492 g. to 2.0 g. per lb.
Vitamin D....246 I. U. to 369 I. U. per lb.

The values announced by the American Institute of Baking for adding to bread bear no direct relation to the figures for flour, but take into account the other ingredients used in bread making. These are:

Required per pound of bread

Vitamin B_1.....1 mg. to 2 mg.
Nicotinic acid.....4 mg. to 8 mg.
Iron .....4 mg. to 16 mg.

Optional ingredients per lb. of bread

Vitamin B_2 (Riboflavin)..0.8 mg. to 1.6 mg.
Calcium .....0.3 g. to 1.2 g.
Vitamin D..150 USP units to 600 USP units

The NRC Announcement

In the announcement of National Research Council it was stated that the committee "has urged the millers and bakers of the nation to start early production of a new flour and bread enriched in vitamins and minerals. The millers and bakers have agreed to start production without delay. Of necessity it will be several weeks before the new flour and bread will be generally available.

"The new flour (and bread) will be called 'enriched'. It will contain thiamin (vitamin B_1), iron and the pellagra-preventing factor, nicotinic acid, in amounts approximating those found in wheat. The name and standards were decided on by conferences of National nutrition authorities, including the Committee on Food and Nutrition of the National Research Council, the Council on Food and Nutrition of the American Medical Association, government nutrition experts and representatives of the milling and baking industries. The U.S. Food and Drug Administration is at present working on regulations relating to the new flour and bread and will announce its rulings later. The name and standards already agreed on in conference, however, are sufficiently close to those that the Food and Drug Administration has had under consideration for flour that millers and makers can start production without waiting for official action."

British Combine

UNDERGROUND FOOD TRAIN

Food is being hauled to subway bomb shelters in London by subway train. This shows women getting the food ready to go on board the train, with the "tube refreshments special" in the background.

What To Put on Labels

In connection with the proposed "enriched" flour and bread, the attitude of the F&DA can well be summed up by saying that, in producing this product it will be necessary only to declare the presence of the added ingredients by their common names, without a declaration of the quantities, provided these additions are substantially in line with the formula recommended by the nutritional experts in their testimony at the flour hearing.

The Army's Attitude

One other attitude concerning these products is noteworthy—that of the Army. When and if the enriched flour is available from all sources from which the Army would normally buy flour, so that competition in bidding can be maintained as required by law, then the Army will consider the possible suitability of the enriched flour for Army use. Until then, the Army is not interested, particularly in view of the fact

that the Army ration is carefully selected to give the soldier sufficient vitamins and minerals at all times.

Production Problems Involved

To supply the necessary materials for "enriching" flour and bread, various vitamin-concentrate manufacturers, yeast companies and millers quickly offered special ingredients. And the millers and bakers went into a scramble to get machines which will do a precision job of incorporating the proper amounts of vitamin and mineral preparations into the flour. And also in demand have been instruments for testing or assaying flour to determine the quantities of concentrates to be added and the correctness of the additions. Fortunately such equipment is already available.

In incorporating the vitamins and minerals into flour, the recommended procedure is to blend the weight of the concentrates and minerals for a day's run of the mill with flour into a master mix in the same manner that prepared flours are made in a small capacity batch mixer. The proportions of this master mix may be regulated by the quantity of flour used to the end that the feeder may be set to deliver 1, 2 or 4 oz. of the master mix per 100 lb. of flour milled. If a master mix is purchased, it need not, of course, be prepared.

Iron Presents Difficulties

In respect to the form in which the thiamin and nicotinic acid or nicotinic acid amide are added, there is no particular problem because they are available in a chemically pure state and have no known chemical, odor or taste effects upon the flour. But such is not the case with respect to iron. The form and proportions in which iron is added has an effect upon the color and keeping qualities of the flour. Development of rancidity is a particular problem.

As many as a dozen different iron compounds are under study. While three forms—sodium ferric pyrophosphate, ferric phytate and iron reduced by hydrogen—are most favorably considered by cereal experts, keeping-test data are yet too limited to warrant definite recommendations. In fact, the required addition of iron may yet prove objectionable in family trade flour.

Work is still being done on methods of checking the vitamin and mineral content of the finished flour. Animal feeding tests are too slow and expensive for mill control use. This method is fast giving way to fermentation and to spectrophotometer and fluorophotometer methods.

The end of troublesome problems involved in enriching flour and bread has not yet been reached.

Defense Advisory Commission Wants Food Output Increased

Anticipates need, if U. S. becomes larder of the democracies, for seasonal canned goods, dehydrated foods, canned meat

THE Food Supply Section of the Defense Advisory Commission is seeking to encourage considerably increased production of a number of major foodstuffs —particularly seasonally packed canned goods, dehydrated foods and canned meats—to avert "bottlenecks" it anticipates will occur if the United States embarks upon a policy of being the larder of the democracies or the soup kitchen for Europe. Stockpile reserves of many staple foods are being considered as one method of preparing for this eventuality.

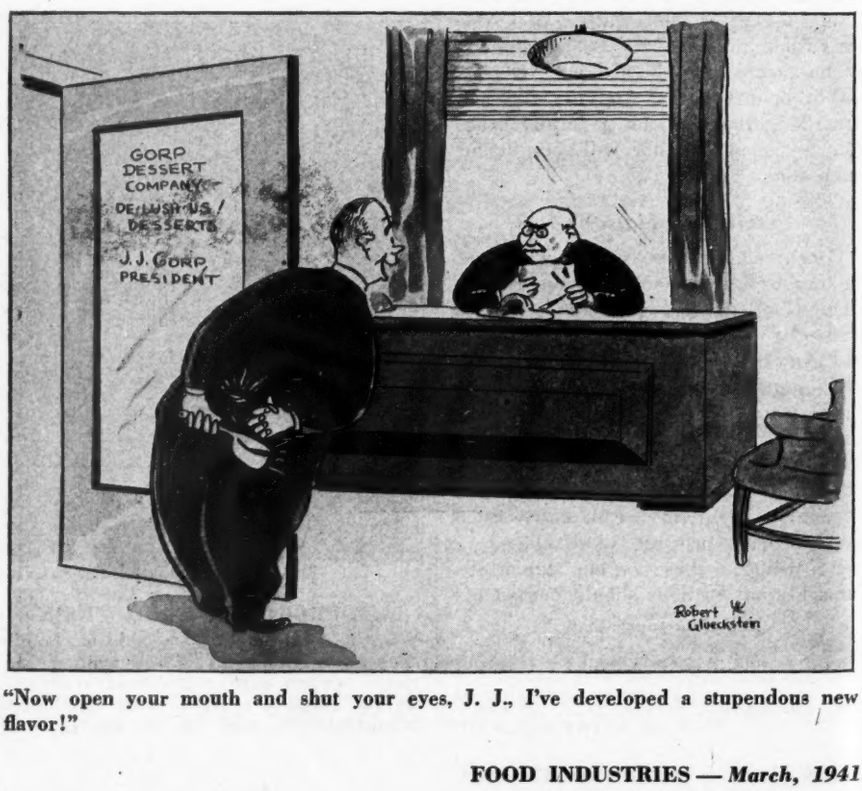
George Livingston, head of the food section under Chester Davis, is frankly disturbed at what he fears is a false sense of security growing out of America's widely advertised farm surpluses. Preliminary analysis of the inventory being made under Mr. Livingston's direction of food processing, distribution and storage facilities indicates the prospect of shortages in some lines despite topheavy surpluses in others; wheat, for instance, won't provide England with the canned vegetables and dried milk she is sure to want if the U. S. is to aid with butter as well as guns.

The inventory is showing what everyone expected insofar as the "home front" is concerned: That there is no problem in feeding the American population. The key to the situation is how much food, and of what kind, the U. S. will be sending to England if the war continues or to the continent of Europe if fighting stops.

The most pressing problem brought out by this revised approach, as Mr. Livingston sees it, is the question of how large this year's seasonal canning pack of fruits and vegetables ought to be. Up for prompt decision is whether to recommend that canners increase their contract acreage of canning crops this spring with a view to insuring sufficient stocks on hand next winter to supply any governmental policy of foreign feeding.

Another line of attack under consideration is rapid stimulation of dehydrated food production, particularly in the fresh fruits and vegetable fields. A stockpile program also is likely to develop for these products. In addition, serious study is being given to Government sponsorship of dehydrating plant expansion.

While fruit and vegetable canning facilities are considered ample come



"Now open your mouth and shut your eyes, J. J., I've developed a stupendous new flavor!"

what may, attention is being given to the adequacy of meat canning facilities. Shipping limitations, it is agreed, will inevitably dictate that any large foreign shipments of meats be in cooked and packaged form.

A problem developing on the "home front" is that of finding sufficient storage facilities for growing surpluses of grain and grain products. Mr. Livingston's preliminary inventory results indicate this indicated shortage may be so acute that the five-year tax write-off plan may be proposed for those who will construct additional terminals. Another phase of the grain situation is the suggestion of a stockpile of surplus supplies in New England as insurance against any railroad car shortage.

Similarly, but on a broader scale to encompass all basic foods, a program is being considered to store stockpiles of foodstuffs in Hawaii so that the islands would not suffer if a Far Eastern crisis affected shipping. Any such program will doubtless be government-financed but there are no details as yet.

Plea of Not Guilty Entered by Bakers

Eleven companies, 31 executives fight government's charges of violating Sherman Act

NOT GUILTY pleas were entered by the 11 baking companies and 31 executives arraigned in the Philadelphia Federal Court on charges of price-fixing and antitrust violation. Charged with conducting price wars in eastern Pennsylvania and south New Jersey and with conspiracy to restrain trade in violation of the Sherman Antitrust Law, the companies on January 9 were indicted by the Philadelphia Grand Jury. (FOOD INDUSTRIES, February, page 64.)

The pleas were accepted with leave granted defense counsel to withdraw such pleas within ten days for filing other motions. R. McDonald Gray, special assistant to Attorney General Thurman Arnold, who handled the preliminary investigation, expects to start the trials in the spring.

By agreement of the government, indictments against two of the individuals named, Mrs. C. A. Schmidt, president of the Capital Bakers, Inc., and C. W. LeFevre, chairman of the Interstate Bakers' Council, were nolle prossed. Twenty-one of the officials indicted entered their pleas of not guilty in person, while counsel made pleas for the other ten individuals, excused from appearing in court. Pleas for the baking companies, called for first, were offered by officials of the 11 organizations.

REELECTED BY BAKERS

L. J. Schumaker, president of American Cone & Pretzel Co., Philadelphia, has been reelected president of American Bakers Association. Gerard R. Williams, president of Williams Bakery, Scranton, Pa., was named chairman of the board of governors; Grover C. Patton, Purity Baking Co., Inc., Decatur, Ill., was elected first vice-president, and Louis Gardner, Gardner Baking Co., Madison, Wis., second vice-president. M. Lee Marshall, Continental Baking Co., New York, was reelected treasurer, and Tom Smith was retained as secretary. The 1941 convention of ABA will be in Boston in October, the date to be set later.

Conference To Be Held

LATEST developments in the frozen food industry will be presented at the Food Preservation Conference sponsored by the University of Texas, March 13-14, in Austin, Tex. The conference is an outgrowth of an initial meeting held two years ago by the American Society of Refrigerating Engineers.

To Set "Enrichment" Day

BAKERS and members of the allied trades will meet in Chicago, March 5, at the Stevens Hotel, to plan a "V" day or suggested date for nationwide introduction of "enriched" flour and bread. Questions on production, labeling, advertising and marketing will be answered at the meeting. The speakers will include M. L. Wilson, U. S. Department of Agriculture, R. M. Wilder, chairman of the National Research Council committee on food and nutrition, W. H. Sebrell, U. S. Department of Public Health, Paul Cornell, public relations counsel, and spokesmen for the baking, milling and allied industries. The meeting will include a round table session for exchange of basic information. Sponsors of the meeting are American Bakers Association, Associated Retail Bakers of America and Millers National Federation.

U.S. May Be Larder Of the Democracies

Federal officials want to use lend-lease law as means of getting export business

THE LEND-LEASE law is rapidly shaping up as a means of making the United States the "larder of the democracies" as well as their arsenal. A movement to ship more foodstuffs and cotton to Britain under terms of the "all-out" aid measure was started in February by agricultural groups and already this movement has reached a specific planning stage.

Significant is the fact that Secretary of Agriculture Wickard is sitting in on most of the White House conferences to work out appropriation estimates for materials to be sent to England. Details of how much foodstuffs will be sent abroad had not been worked out as this was written but the big "bottleneck" is not the question of how to send. Rather, the problem is how much is there ship space to accommodate.

England is reliably estimated to have one year's supply of food on hand if its basic livestock is counted; in other words, by eating up her milk cows for meat. From a practical standpoint, however, this estimate is of little value. No one can estimate, for instance, how the knowledge that their basic supply was being used up would affect the morale of the British people.

Use of the lend-lease measure as a vehicle for feeding the democracies is not being advanced here entirely as an aid measure, however. Chester Davis, agricultural member of the defense commission, is primarily concerned in holding for American farmers the markets which have been theirs normally. He readily appreciates the ease with which British can get used to Turkish tobacco, for example.

His proposal, which was the first direct suggestion along this line, was to make provision, either as part of the lend-lease measure or by negotiation accompanying it, whereby the United Kingdom will take from the United States the normal proportion (pre-war level) of agricultural commodities which she must import.

The aid bill as originally drawn was broad enough to permit sending foodstuffs and no change made by Congress cut down its scope in that direction. As the House Foreign Affairs committee pointed out in reporting the measure to the floor, the words "defense article" include not only guns but also "commodities such as cotton, wheat, and all other agricultural products which may be necessary for defense purposes."

Walsh-Healey Exemption For Canners Is Denied

Ruling hinders centralized mass buying of food for the Army

AN ASSERTED quirk in the law has, temporarily at least, stymied the Quartermaster Corps' efforts to obtain modified relaxation of the Walsh-Healey Act for canners during the seasonal pack to permit direct buying of canned fruits and vegetables. The War Department's first application to the Labor Department has been denied and the case closed pending decision from the top on the next step.

Insistence by L. Metcalfe Walling, Walsh-Healey Administrator, that no authority exists to relax wage and hour provisions of the law without also relaxing the child labor and health and safety regulations was the point upon which the case got hung up. And Mr. Walling issued an order marking the case closed, without prejudice to the Army's right to come in again. Despite reports to the contrary, QMC's petition was not withdrawn.

Walsh-Healey applies only to work done on a government order after the contract is awarded, but it is pointed out that in the case of fruit and vegetable canning it is practically impossible for a canner to attempt segregation of government work from commercial work during the canning rush; he couldn't know in advance, for instance, what part of his pack would meet Army standards.

Thus the Army will have to buy after the pack is over (when Walsh-Healey can be applied in the shipping department) or purchase from wholesale speculators.

HONORED BY NEW JERSEY

Mrs. Elizabeth F. Lee, operator of Cranberry Canners, Inc., New Egypt, N. J., was recently honored by the New Jersey State Board of Agriculture for her leadership and outstanding contributions to the welfare of the cranberry industry. At the 1941 Agricultural Convention she was presented with the Citation for Distinguished Service to Agriculture.

Heated Session Held On Chocolate Standards

Sweetener controversy takes new turn. Emulsifiers discussed

BETWEEN January 27 and February 7, the chocolate products hearing was in heated session. The principal discussion centered on emulsifiers and sweeteners, as anticipated. But the sweetener controversy took a new twist not heretofore encountered.

A charge was made by sucrose refiners that "turbinados" (partially refined sucrose) were not suitable sweetening agents for food products. Evidence was presented to show that impurities and contamination were found in certain cases. The result was to open an entire new field of controversy within the sucrose field.

The attack came as a surprise to the manufacturers of the turbinados. Their counsel requested a short recess to give them time to prepare suitable defense. Owing to conflicting dates of both the presiding officer and all interested parties, March 31 was the earliest date which could be agreed upon. At this time the chocolate hearings will be resumed.

Considerable time and expense were saved, however, by agreement between sucrose and dextrose manufacturers on certain basic facts presented in testimony at earlier hearings. Part of the records

Schedule of Current Action on Food Standards

(Dockets 1 to 10 and 13 to 20 have been completed and dropped from this table)*

	Docket number and commodity	Type of standard or regulations	Presiding Officer	A First announced in *Fed. Register*	B Initial hearing date	C Preliminary briefs due not later than	D Tentative order published in *Fed. Register*	E Final order published in *Fed. Register*	F Effective date of order
11-A	Cheddar cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40	Jan. 9, '41	April 9, '41
B	Washed curd cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40	Jan. 9, '41[4]	April 9, '41
C	Colby cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40	Jan. 9, '41[5]	April 9, '41
12	Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39	Feb. 5, '40[1]	Oct. 2, '40	.....	.....
21-A	Flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40[1]	Dec. 17, '40	.....	.....	.....
B	Durum flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
C	Whole-wheat flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
D	Cracked wheat	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
E	Crushed wheat	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
F	Whole durum wheat flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
G	Self-rising flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
H	Phosphated flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
I	Farina	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
J	Semolina	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
22	Tomato catsup	Identity[2]	W. G. Green, Jr.	Aug. 10, '40	Sept. 11, '40	Sept. 24, '40	Oct. 17, '40	Jan. 9, '41	Jan. 9, '41[6]
23	Canned fruits	Identity[3]	M. F. Markel	Aug. 17, '40	Sept. 16, '40	Dec. 11, '40	.....	.....	.....
24	Dietary foods	Label statements	M. F. Markel	Sept. 5, '40	Oct. 7, '40	Nov. 25, '40	.....	.....	.....
25	Oleomargarine	Identity	E. B. Williams	Oct. 11, '40	Nov. 18, '40	Jan. 6, '41	.....	.....	.....
26	Chocolate Products[7]	Identity	M. F. Markel	Oct. 19, '40	Dec. 9, '40	.....	.....	.....	.....
27	Fruit cocktail	Identity, Quality and fill of container	M. F. Markel	Dec. 11, '40	Jan. 13, '41	Feb. 8, '41	.....	.....	.....
28	Canned fruits[8]	Quality	M. F. Markel	Dec. 11, '40	Jan. 16, '41	.....	.....	.....	.....
29	Neufchatel and cottage cheese	Identity	W. G. Green, Jr.	Jan. 30, '41	Mar. 17, '41	.....	.....	.....	.....
30	Habit forming drugs	General Regulations	M. F. Markel	Jan. 30, '41	Mar. 3, '41	.....	.....	.....	.....

* Docket 1 pertains to tomato products, 2 to canned tomatoes, 3 to eggs and egg products, 4 and 9 to coal-tar colors, and 5 to canned peaches, apricots, pears and cherries. See FOOD INDUSTRIES, October 1939, page 569; January 1940, page 70; and February 1940, page 73, for data on these standards. Docket 6 pertains to canned peas; 7, cream and milk; 8, canned vegetables; 10, fruit jams, jellies and butters; 13 and 14, coal tar colors; 15, dietary foods (cancelled); 16, canned tomatoes; 17, flours; 18, canned asparagus; 19 and 20, canned cherries. See FOOD INDUSTRIES, September 1940, page 66, for data on these dockets.

[1] Time extended from earlier date previously announced.

[2] Amendment to order published in Federal Register, July 29, 1939 (Docket No. 1-C).

[3] Amendment to orders published in Federal Register, Dec. 22, 1939, and Jan. 9, 1940. (All parts of Docket No. 5).

[4] A typographical error was corrected in the Federal Register, Jan. 22, 1941.

[5] A typographical error was corrected in the Federal Register, Jan. 16, 1941.

[6] Since the amendment was denied there was no change in the standard. Therefore the order was effective immediately.

[7] Including cacao nibs; chocolate liquor; sweet chocolate (coating); skim milk chocolate (coating); buttermilk chocolate (coating); mixed milk, skim milk, buttermilk, malted milk chocolate (coating); cocoa; breakfast cocoa; low-fat cocoa; sweet cocoa and fat (other than cacao fat) coating; and sweet chocolate and fat (other than cacao fat) coating.

[8] Amendment to docket No. 5, Parts I, II and III, orders of Dec. 22, 1939, and Jan. 9, 1940.

of the canned fruits and preserve hearings was ordered copied into the record of the chocolate hearing.

The emulsifier question was also thoroughly discussed. The manufacturers of lecithin sought to show that only their product was suitable for use as an emulsifier in chocolate products. However, the manufacturer of "Chovis," a synthetic emulsifier made principally from hydrogenated cottonseed oil, presented a very persuasive case. It was the consensus of those at the hearing that both lecithin and Chovis would probably be permitted in the final standards when issued.

Some further discussion was also had on the ratio of milk fat to milk-solids-not-fat in the various milk chocolate coatings. Industry objection still was heard to a standard which would require formulas to be changed from present practice to the extent proposed.

F&DA Starts Action On Cheese Standards

Other standards are considered at hearings in Washington

A new docket has been announced in the series of hearings establishing definitions and standards for food products. It relates to Neufchatel cheese, cottage cheese and creamed cottage cheese. The hearing begins on March 17, and will consider the standards as proposed in the *Federal Register* of January 30.

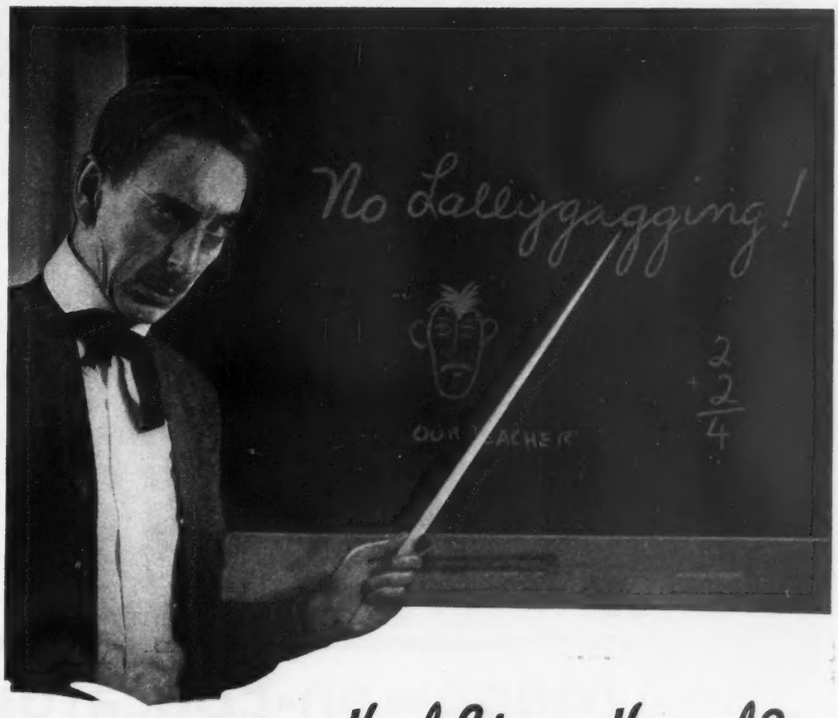
Dockets on which official actions are expected include the following: The final order on creamed cheese standards, and tentative orders on flours, canned fruits, dietary foods, oleomargarine and canned fruit cocktail.

The hearing on standards of quality for canned fruits of irregular sizes and shapes was resumed on February 17, but only long enough to recess again until April 1.

The chocolate products hearing has not yet adjourned, although it has recessed from February 7 until March 31. Further details of this docket are given in another story in this issue.

Two open meetings of the food standards committee were held during early February. The first of these was to consider formulation of maturity and frost damage standards for oranges and grapefruit. It was a very short meeting with less than a dozen representatives of the citrus fruit growers in attendance. No definite proposals were offered by the growers, although there was considerable discussion of the Florida and California state regulations and present industry practices.

The other open meeting was to consider frozen desserts. This was a sequel to the meeting held in November, 1939.



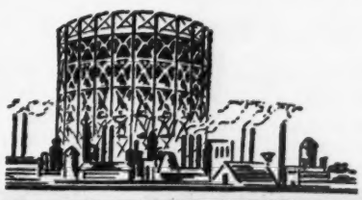
Had You Heard?

People are eating more. And why not? They're working more, *and faster*... and so will you if you're not already!

"Food will win the war." Ever hear that before? We prophesy you'll be hearing it again... *and soon!*

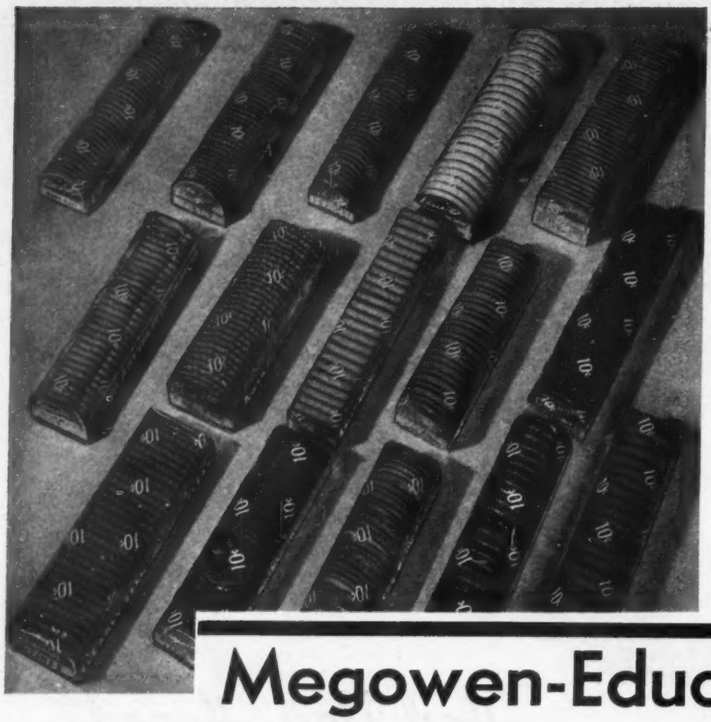
Kemp equipment can be a great help to you in getting bigger production from your existing facilities. First, Kemp equipment speeds up roasting, toasting, high-temperature cooking wherever it can be done without injury to the product, and Kemp speeds up drying and can-making operations. Second, in providing more accurate, fully automatic control, Kemp cuts rejects.

It used to be, people bought Kemp equipment because it saved so much fuel (15 to 40 percent and more). Kemp still does that... but nowadays, *production* is the thing. Write, wire or phone and tell us what you need done faster. We don't "lallygag" either. The



C. M. Kemp Manufacturing Company... 405 East Oliver Street, Baltimore, Maryland.

KEMP of BALTIMORE



Megowen-Educator
lures the DIME with tempting product display

Faultlessly wrapped on our FA Machines

"I look mighty tempting, don't I? — and a dime buys me", says each of these Megowen-Educator packages.

With practically 100% visibility to display these tasty-looking crackers, plus neat, faultless wrapping to make a quality impression, this line has all that it takes to ring the dealer's cash register.

All the 22 varieties in this "open boat" line, as well as other Megowen-Educator packages, are wrapped by our Adjustable FA Machines. Note the many sizes and shapes. Also observe how the machine forms the wrap just as smoothly and tightly over the rounded crackers as it does over the square types.

Because of its extreme versatility, its wide size range, its quick adjustability, the FA has won wide popularity among food manufacturers as well as in other fields.

Keep your information files up-to-date.

See our Exhibit at the
11th PACKAGING EXPOSITION
Booth 406
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April 1-4

Write for leaflet on the modern FA

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
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PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

The International Association of Ice Cream Manufacturers had suggested definitions and standards of identity for frozen desserts at that time, and their representative stated they did not wish to make any change now. The food standards committee implied that there might be standards proposed for vanilla ice cream, chocolate ice cream and strawberry ice cream, and one other all-inclusive standard to cover other flavors. Standards may also be proposed for ices and sherbets; but the status of an "ice milk" standard is somewhat doubtful at this time. This meeting was described merely as "brush clearing." The government-proposed standards and formal hearing will probably not come until after the peak season of 1941.

Army Hires Dietitian To Plan Meals for Camps

Service dovetails into central food purchasing program

SECOND of three major steps which completely revamp the system of Army mess formally goes into practice this month. The Quartermaster Corps has recruited for the staff of the Office of Production Management Miss Mary Barber, nutritionist for Kellogg Co. and president of the American Dietetics Association, to plan daily menus for the boys in camp.

Starting this month, Miss Barber's menus will be sent each camp twice monthly with three-squares-a-day for 15 days in each installment. The menu service dovetails into the central buying program.

Menus will not necessarily be the same for all parts of the country, for it is intended that the program make full use of local tastes, season of the year and locality, and the relative greater availability of some commodities over others. A direct ratio also is planned between total supply and the soldier's diet; for instance if there is five cans of peas packed for every three cans of green beans, Miss Barber's menus will contain peas five times for every three times for beans.

This central planning of camp meals is, of course, a rather obvious step to augment the central buying program. It is explained that it would do no good to have the Army buying its foodstuffs in carloads lots wherever possible unless there also is control at the point of consumption to insure that what is bought is eaten. These two steps are leading, inevitably, to the third in this over-all program, which is issue of ration in kind rather than as a cash credit—a change still to be formally inaugurated.

Government Considers Fats and Oils Control

May build up domestic stockpile as a national defense move

EXPORT LICENSE CONTROL and accumulation of domestic stockpiles of a number of fats and oils are getting serious consideration within the government's defense agencies. This is due principally to entrance of Japan and Russia into the market with purchases in continually and sharply increasing amounts.

The first step is likely to be limitation of copra and coconut oil exports from the Philippines, whose stocks are being raided by Japan and Russia, together with some form of stockpile program both to assure the U. S. of ample supplies and to lighten the economic impact upon the Filipinos. A report outlining the sharply growing extent of Russian and Japanese fats and oils purchase and asserting the probability that much of this new trade is destined for ultimate German consumption has been sent from the agriculture division of the defense commission to the export control administration office. The report makes no formal recommendations but outlines possible remedial actions.

U. S. stocks of fats and oils, including these we import, at present are adequate or in surplus almost all along the line, according to the report. Increasing difficulty of obtaining shipping space, however, is considered a threat to future imports and is seen as likely to make it easier for Japan and Russia to increase their raids on the Philippine market.

Army Wants Food Inspectors

THE U. S. Civil Service Commission is seeking applicants for positions under the title, Inspector, Subsistence Supplies, in the Army Quartermaster Corps. Pay for the various grades ranges from $1,620 to $2,600 annually. Duties involve inspectional work of such food supplies as fruits and vegetables, condiments, beverages and staples.

Applicants must show experience in inspection or purchase of a variety of foodstuffs. Laboratory testing experience in food products or certain appropriate college study may be substituted. Grades in which positions are open are principal, senior and full, to those between 25 and 55 years of age, and assistant and junior, to those between 21 and 25.

Applications will be rated as received at the Commission's Washington office.

SCHEDULE OF EVENTS

MARCH

6– 8—National Dairy Council, winter conference, Hotel John Marshall, Richmond, Va.
10–13—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.
13–14—Food Preservation Conference at University of Texas, Austin, Tex.
17—Ten-week Technical course of Seibel Institute of Technology will open at Chicago.

APRIL

1– 4—Eleventh annual Packaging Exposition and Conference, Stevens Hotel, Chicago.
7–11—Agricultural and Food Chemistry Division of American Chemical Society, St. Louis.
21–26—National Retail Bakers Week.
22–24—Pacific Northwest Bakers Conference, Hotel Multnomah, Portland, Ore.
28–30—Bakery Sales Association, Drake Hotel, Chicago.

Packaging Men To Study Effect of Defense Plan

PACKAGING PROBLEMS created by the defense program are expected to attract a record number of packaging, packing and shipping executives to the eleventh annual Packaging Exposition and Conference to be held April 1–4 in Chicago. The conference will study recent trends in packaging during production, the need for substitute materials and more extensive standardization of design.

The American Management Association sponsoring the conference has this year arranged a program slanted from a technical angle, including an address by an English executive on wartime packaging problems.

Subjects under discussion will include:

A Case History of Informative Labeling, Fred C. Hecht, Sears, Roebuck & Co.

The Economy of Packaging, E. A. Throckmorton, Container Corp. of America.

How Does the Defense Program Affect Packaging? (A symposium).

The Permeability of Fiber Containers to Water Vapor, Warren Emley, U. S. Dept. of Commerce.

Display Value in Package Merchandising, W. L. Stensgaard, W. L. Stensgaard Associates, Inc.

The Necessity for a Package Testing Program. (Speaker to be announced.)

How the Warring Countries Met Their Packaging Problems, I. M. Sieff, Marks and Spencer, Ltd., London, England.

The Standardization of Container Capacities, Alex Pisciotta, National Weights and Measures Committee.

Versatility in Gluing Mechanisms, Dr. F. C. Campins, National Starch Products, Inc.

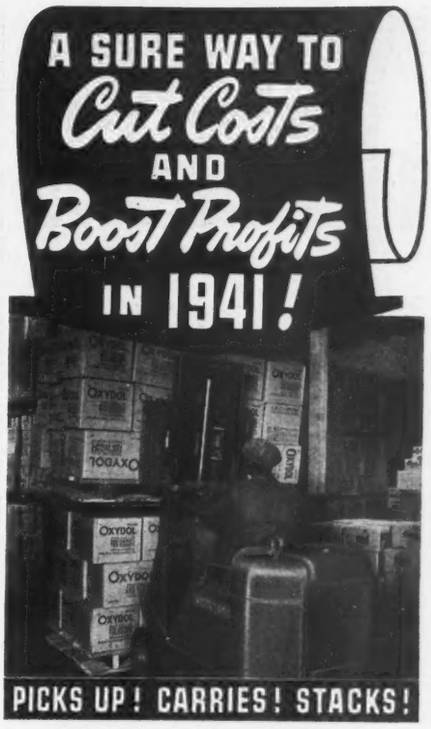
Manual vs. Machine Operations as Cost Factors, E. A. McElwain, Johnson & Johnson.

Trends in the Use of Forest Products for Shipping Containers, Ralph W. Marquis, U. S. Forest Service.

Packing and Shipping Specifications on Army and Navy Shipments, A. W. Luhrs, Container Testing Laboratories.

Corrugated Board and its Component Parts as Engineering Materials, T. A. Carlson, U. S. Dept. of Agriculture.

Shipping Container Clinic.



NEW LOW-PRICED LIFT TRUCK!

For Loads up to 3,000 lbs. Speeds up Handling, Saves on Storage Space, Quickly Pays for Itself.

Think of it! This new Towmotor LT-40 loads and unloads box cars, trucks in *minutes,* instead of *hours;* scoops up bags, barrels, drums, cases . . . up to 3,000 lb. loads . . . moves them 250 feet in only 30 seconds. YET... costs less to operate than you pay a single trucker. Any wonder, then, that the Towmotor LT-40 is called a *sure* way to extra profits?

And it affects profits in many ways. Minimizes handling . . . preventing damage to packages, labels (carton goods especially). Pallet stacking (or skids) keeps goods off floors, utilizes storage space near ceilings. Simplifies assembling of orders for one-load shipping. Speeds up service . . . increasing customer satisfaction, lessening risks in perishable goods. Ends injuries by eliminating heavy lifting, pushing. Small, compact . . . easy to operate in any quarters. Priced low. Quickly pays for itself. Our experts train your men, help you plan handling efficiently to get "lowest cost per ton moved." Want proof? Mail coupon!

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Send me your Bulletin giving some real facts about saving money on handling, storing goods.

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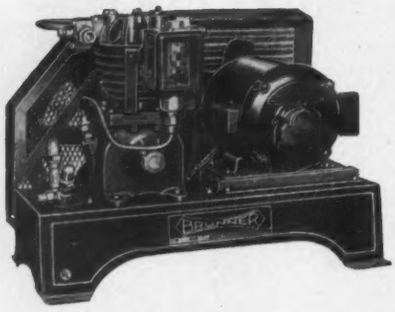

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● Users of refrigeration in the food industries appreciate the dependability and worthwhile advantages provided by Brunner condensing units... low cost, efficient protection that safeguards products and profits. Every Brunner unit is manufactured carefully to meet specific requirements that give expected outstanding results in service. Brunner condensing units are built, inside and out, to "stand the gaff" of the severest 24-hour duty applications. Extra heavy castings... automatic overload protection... precision machining of moving parts ... bronze bearings ... these are but a few of the Brunner features that result in dependable, trouble-free performance at low operating cost. Brunner units carry the approval of Underwriters' Laboratories and U. L. Seal. They are available from ¼ to 25 tons of refrigeration. Brunner Manufacturing Co., Utica, N. Y., U. S. A.

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GET THESE MONEY SAVING FACTS

BRUNNER
CONDENSING UNITS

Dehydrating Industry Prepares to Supply Army

MAJOR PRODUCERS of dehydrated foods have organized their industry to cooperate with the government in supplying their products for the Army and Navy, as well as to make their facilities available for whatever program of food aid to Britain or the continent is decided upon at Washington.

L. K. Harper, vice-president of Sardik Food Products Co., is chairman of a four-man executive committee, consisting of a member from the East, Mid-west and West, which is working with C. E. Birgfeld of the Department of Commerce foodstuffs division in preparing specifications for acceptance by the Army and Navy. Another committee consisting of a member from each of 11 dehydrated food producer companies also has been named.

In addition to the specifications, a detailed economic report of the industry is being prepared for the Government showing the types of plants, types of products, seasons of pack, capacities, locations of plants, etc., so that the widest and wisest use of the facilities can be made in meeting food procurement problems.

CAPITAL VIEWS

BETTER ARMY DIET—The Army hopes to make better men out of the draftees, mentally and physically. Skilled organization of menus and food supply is assured. This gives food manufacturers a new chance to educate large numbers of individuals if they have something that fits the new program. The "man" to be sold is Miss Mary I. Barber who, in the Office of Production Management, is the key planner and chief food consultant for the Quartermaster General of the Army. Food manufacturers who neglect this opportunity to put their goods where they fit into the Army program may find that their competitors have a lot of new friends whom they have missed.

COFFEE TREATY—The Senate ratified early in February the treaty which the 14 Latin American nations drafted apportioning the coffee exports to the United States. This, officials argue, will stabilize coffee prices. Certainly it will stabilize the economy of those South American nations which depend so largely on coffee sales for good times at home. The argument is that there will be no increase in retail price, but some anti-administration politicians differ on this point. In any event, it is now a ratified treaty binding on Uncle Sam as on the South American countries.

UNIFORM LABEL RULES—The Bureau of Animal Industry has decided that revisions of labels of meat products which it approves must conform also to all Food, Drug and Cosmetic Act requirements. This evidence of active cooperation between the two regulatory agencies means that BAI rulings and F&DA rulings will not be in conflict. Meat packers and others who sell to the meat products industries will be well pleased at this unified practice. A new edition of BAI rules regarding labeling, describing all these matters, is expected shortly.

TAX MONTH BLUES—With March we have tax returns to prepare. Also Congress is expected then to start considering new, and increased, taxes. Certainly some of the food industries are going to come in for special and unwelcome attention. But they will have much company in their misery as all business taxes affecting every kind of manufacturing are bound to be upped strongly this spring. The talk is that at least a billion dollars per year more income must be levied at once.

PROCEDURAL REFORM—Probably no other Federal agency has been so much under fire for its methods of procedure in dealing with industry as the National Labor Relations Board. The two new members of that Board, Millis and Leiserson, are confirming the forecasts of their friends by the radical revision of NLRB rules announced during February. The prosecution and judicial-review functions of the Board are being separated into different units. Many other reforms proposed in the Walter-Logan Bill of last Congress (vetoed by the President) are really made effective by the new plans of this agency. It appears that wise administration of mediocre law can be made fairly satisfactory, just as bad administration of good law can be terrible for business. Much less difficulty with labor problems which come to NLRB attention may be expected from now on. Real enforcement of the law should be expected. But zealous crusading is out of fashion with the new Board membership.

AGRICULTURAL POLICY—The Department of Agriculture has embarked on a definitely modified policy under the leadership of Secretary Claude R. Wickard. Mere restriction of production does not satisfy this new Cabinet member. He believes that increased production under conditions that permit increased consumption by underprivileged families is the root of successful development for agriculture. This philosophy is going to have an important impact on food manufacturing. It means that each food processor must try to find just where his business fits in. And to fit, it will be necessary that the processor lend a real service somewhere between the little pigs and the pork chops. This must be done without increasing the price of the latter to the point that the low income families get none of the "surplus" production. Every division of food processing has this kind of a problem. The solutions will not be easy, but they will be important both for those who find them and those who miss them.

Construction News

	Pending (thousands)	Awarded February (thousands)	Total Awarded 1941 (thousands)
Bakery	.....	$40	$2,780
Beverages	$380	1,195	1,756
Canning and Preserving	50	40	80
Cold Storage Plants	170	.....	152
Confectionery	.....	.....	.....
Grain Mill Products	6,240	350	877
Ice Manufactured	.....	40	40
Meats and Meat Products	.....	80	268
Milk Products	440	200	285
Miscellaneous	760	355	669
	$8,040	$2,300	$6,907

U. S. May Prevent Japan From Dumping Red Salmon

JAPAN'S signing up with the Rome-Berlin axis has brought about a threatened dumping of Japanese canned red salmon on the American market. This is seriously disturbing the Federal government and the American industry. No policy of action had been decided upon in Washington in late February although several possible courses of action were under consideration.

The fall of France and England's cutting off Japanese imports has blocked the normal outlet for about 800,000 cases, with an estimated value of $9,000,000, of Nippon's current salmon pack.

Canners Aid Army Buying

ABOUT the middle of February the National Canners Association sent to all canners a form on which the canner might indicate what commodity he wished to sell to the Army, and how many cases he would like to sell. It was stated that central office purchasing by the Army would be started about April 1. In the meantime, the canners were invited to write directly to any of a list of officers who are making purchases prior to organization of centralized purchasing. A list of the delivery points for Army food purchases was also included.

Label Exemption "Extended"

PENDING the effective application of definitions and standards of identity, or an announcement that standards will not be issued, the Food and Drug Administration will not prosecute a number of foods on the ground that they do not declare ingredients on the label. The foods so exempted are the list originally announced in February, 1939 (FOOD INDUSTRIES, March, 1939, page 164), plus ice cream and carbonated beverages. For convenience this list is summarized below:

White bread; whole wheat bread; milk bread; raisin bread; evaporated milk; sweetened condensed milk; malted milk; unmixed, immature canned vegetables; unmixed canned fruits; canned oysters; canned clams; canned shrimp; canned fish roe; sauerkraut; olives in brine; cheeses; oleomargarine; mayonnaise dressing; fruit preserves; sweet chocolate; sweet milk chocolate; lemon extract; orange extract; vanilla extract; ice cream; frozen custard; ice milk; milk sherbet; water ice or ice sherbet; and nonalcoholic carbonated beverages.

Livestock Value Increases

THREE PERCENT INCREASE in value of livestock on farms in the United States on Jan. 1, 1941 over Jan. 1, 1940, was noted in a recent report of the U. S. Department of Agriculture. These animals were valued at $4,921,313,000, according to the report.

Decrease in hog numbers, from 60,207,000 head a year before to 52,983,000 head this year, was the change most significant to the food industries.

Cattle numbers increased from 68,801,000 head to 71,666,000 head, while sheep increased from 54,549,000 head to 55,880,000 head.

In contrast, poultry numbers decreased, the figures for chickens falling from 429,042,000 to 413,934,000; while turkeys decreased from 8,567,000 to 7,030,000 during the year.

Canned Food Packs Likely to Increase

DEMAND for canned fruits, vegetables, meat and fish in the coming production year (1941–1942) should show considerable increase. In the first place, increasing employment and higher payrolls are likely to increase the market for canned foods. Also, the Army is a large buyer of canned foods and it is estimated by food buyers in the OPM that the military forces may need as much as from 10 to 15 per cent of the production of a number of staple canned products. Finally, there is the likelihood of improved exports of canned foods—perhaps to Great Britain as a result of lease-lend legislation, particularly of canned fruits and tomatoes—and also to Greece, Spain, China and other countries.

These facts all came up for discussion at the food conventions held in Chicago in late January, and are widely known among canners. As a result it is likely that crops for canning will be increased this year and larger packs will be turned out.

Sugar Use at High Peak

CONSUMPTION OF SUGAR in the United States in 1940 reached record levels, exceeding the previous record made in 1939, according to AAA. Figures for

2 Packages a Second . . . 50,000 a Day!

So Sprague-Warner *turned to* LAMSON Package Conveyors for help

Grocery packages flowing into and out of the warehouse faster than a watch ticks — 2 packages every second! That was the problem of Sprague-Warner, Chicago wholesale grocers. The system just couldn't slow down . . . just didn't dare to stop. The hand-trucking, cross-hauling, confusion and cost put terrific pressure on everyone concerned. So Sprague-Warner called in Lamson conveyor engineers. Now 36 Lamson belt and gravity package conveyors are taking form—converting all motion into straight-line flow.

LAMSON CONVEYORS ARE DEPENDABLE

Whether it's 50,000 or 1,000,000 units a day, Lamson conveyors have proved their dependability in service. Lamson's 61-year record of day-in-day-out service in thousands of different industries deserves your serious consideration. And every Lamson conveyor embodies not only the proved refinements developed from this wide practical experience, but the latest findings of continuous and aggressive research.

WHAT WILL LAMSON CONVEYORS DO FOR YOU?

Lamson engineers are trained to give you a sound answer to that question, based on facts. Supported by a broad line of conveying equipment, their judgment is not cramped by physical limitations, their recommendations are aimed solely at providing "the one best way" to solve your problem. Don't wait. Get complete facts today. Mail the coupon now for the free folder, "The Shortest Road to Profit in the Food Market."

LAMSON Conveyors

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Without cost or obligation, please rush by return mail a copy of your pictorial folder—"The Shortest Road to Profit in the Food Market."

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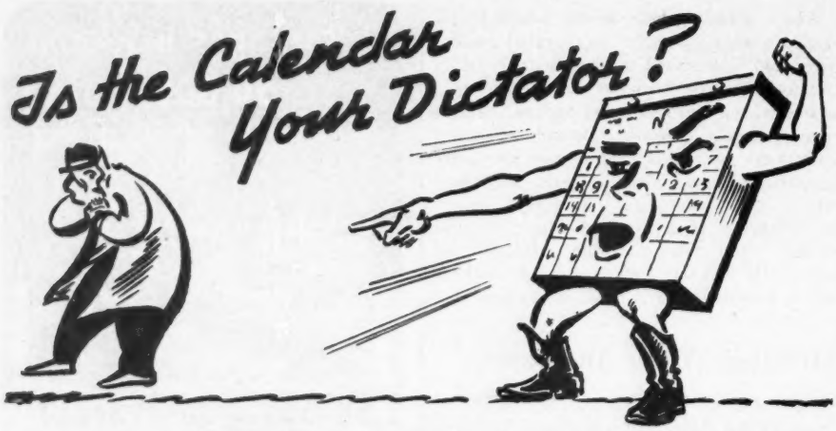


The "fiscal year" for canners and processers of perishable foods is only a few short months. But why let the calendar tell you when your profits should start and stop? Potatoes are always in season, and a

FERRY AUTOMATIC
JULIENNE MACHINE

can turn them into a non-stop business the year 'round. Two men with one machine can turn out a continuous and profitable stream of the finest juliennes you ever tasted—the kind that win new customers and keep old ones happy. Ferry Julienne Machines are fully automatic except for inspection of the washed slices and are available in capacities from 100 to 240 pounds per hour. If you're interested in the facts and figures on this 12-month's money-maker write today for Bulletin F. I.

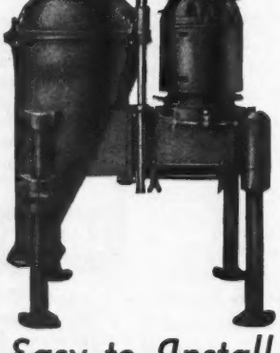
J. D. FERRY CO. 129 So. Cameron Street HARRISBURG, PA.

INSECT INFESTATION IN COMPOUNDS

Compounds such as Self-Rising and Pancake Flours are abnormally subject to insect infestation due to the added mill operations and also to infestation in ingredients blended with wheat flour to make the finished product

The Bulk Flour **ENTOLETER** INFESTATION DESTROYER

MECHANICALLY destroys all insect life in all stages: egg, larva, pupa and adult, as part of the milling process



Inexpensive—Easy to Install and Operate
Minimum Maintenance

ENTOLETER DIVISION
THE SAFETY CAR HEATING AND LIGHTING COMPANY, INC.
230 PARK AVENUE NEW YORK, N. Y.

Sugar Consumption

These estimates of annual consumption in the United States of sugar and competitive sweetening agents are based on available information from official and trade sources. They are for the calendar year 1939.

	Dry Sugar Equivalents (Million Pounds)	(Pounds per Capita*)	Percent of Total
Cane sugar.....	9,465	72.8	63.5
Beet sugar.....	3,480	26.8	23.4
Refiners' sirup..	30	0.2	0.2
Invert sugar sirup	89	0.7	0.6
Liquid sugar and other sugar sirups	136	1.0	0.9
Sugar cane sirup	180	1.4	1.2
Edible molasses.	123	0.9	0.8
Corn sugar.....	220	1.7	1.5
Corn sirup.....	915	7.0	6.2
Sorgo sirup.....	83	0.6	0.6
Maple sugar....	10	0.1	0.1
Maple sirup....	19	0.1	0.1
Honey	129	1.0	0.9
	14,879	114.3	100.0

* Basis: Population 130,000,000.

the year, complete except for deliveries of Florida and Louisiana grown sugar, show a consumption of 6,858,766 short tons, raw value. Missing figures are expected to be at least 10,000 tons, which will bring consumption above the total 1939 deliveries of 6,865,000 tons.

Commodities Still Rise

UPWARD TRENDS in food commodity prices noted in FOOD INDUSTRIES last month continued in the period from mid-January to mid-February, although the *N. Y. Journal of Canneries'* weekly index of general wholesale commodity prices fell somewhat, from 83.3 on January 18 to 82.6 on February 15. In contrast, the U. S. Department of Labor's wholesale price index rose from 80.2 on Jan. 11 to 80.5 on Feb. 8, and its food price index rose from 73.0 to 73.2. During the same weeks the Labor Department's index of farm prices fell from 71.0 to 70.0. The cost of living index of National Industrial Conference Board, which stood at 85.9 in December, 1940, rose to 86.0 in January 1941. *Business Week's* index of business activity, at 142.3 on Jan. 11, rose to 144.3 on Feb. 8.

Among the individual commodities, wheat, No. 2 dark winter, Kansas City, fell from 83¾¢ on Jan. 15 to 76¢ on February 15; corn, No. 3, yellow, fell from 63¼¢ to 62½¢ and flour fell from $5.05 to $4.75. Beef fell from 19¢ to 18¢, pork loins from 19¢ to 17¢, while lamb was unchanged at 17½¢. Dairy products also fell, with butter going from 31¼¢ to 30¾¢ and eggs from 19¼¢ to 18¢.

Imported food staples were generally up, with sugar increasing from $2.94 to $2.98, coffee rising from 7¾¢ to 8¼¢, and cocoa jumping from $5.25 to $5.75. Canned foods were steady, except tomatoes, which advanced from $0.55 to $0.60.

INDICATORS

CONFECTIONERY and competitive chocolate products sales in December, 1940, based upon returns from 219 manufacturers, totaled $26,263,000 according to the U. S. Department of Commerce. This was 13 percent more than in December, 1939, and 6 percent below November, 1940.

TOMATOES canned in 1940 totaled 25,231,877 cases, all sizes, compared to 21,009,401 cases in 1939, as reported by National Canners Association.

TOMATO PULP packed for sale in 1940 totaled 2,104,898 cases, all sizes, compared to 2,106,659 cases in 1939, according to National Canners Association.

GREEN BEAN PACK in 1940 was 7,963,012 cases, all sizes, compared to 6,945,970 cases in 1939, according to National Canners Association.

WAX BEAN PACK in 1940 was 1,225,765 cases, all sizes, compared to 1,109,873 cases in 1939, according to National Canners Association.

FLOUR PRODUCED in January, 1941, by mills producing 64 percent of U. S. output, was reported by *The Northwestern Miller* at 5,665,946 bbl., compared to 5,559,674 bbl. in January, 1940, and to 5,380,593 bbl. in December, 1940.

CANNED SALMON PURCHASES by the Army in 1941 are expected to approach 10,000,000 No. 1 cans of 12 oz. net capacity each.

SUGAR EXPORTS from the United States in 1940 were 152,730 long tons, the largest since 1925, according to Lamborn & Co.

CHEESE EXPORTS from Argentina, mostly to the United States, were valued at 1,491,391 pesos in January, 1941, compared to 151,705 pesos a year previous.

FLUID MILK SALES in December, 1940, were 3.26 percent above those of December, 1939, according to the Milk Industry Foundation.

MILK PRODUCTION in January, 1941, was the highest ever recorded for January and was about 5 percent more than in that month in 1940.

MILK PRODUCTION per cow on Jan. 1 was the highest ever recorded for the date and was 3 percent above production on Jan. 1, 1940.

BUTTER CONSUMPTION in the United States in 1940 was 17.5 lb. per capita, compared to 17.7 lb. a year before.

BUTTER, creamery, produced in the United States in December, 1940, was 125,540,000 lb., 6.4 percent above December, 1939, output and 9.2 percent above the 1930-1938 December average.

BUTTER, creamery, produced in 1940 totaled 1,808,050,000 lb., a new record, 3 percent over 1939 output and 8 percent over the 1930-1938 average.

CHEESE, American, produced in December, 1940, was 33,635,000 lb., compared to 30,559,000 lb. in December, 1939, and to a 1930-1938 average of 24,243,000 lb.

CHEESE, American, produced in 1940 totaled 589,215,000 lb., 10.5 percent over 1939 production and 33.3 percent above the 1930-1938 average.

EVAPORATED MILK PRODUCTION in 1940 is estimated at around 2,500,000,000 lb., more than 14 percent above 1939 output.

OLEOMARGARINE SALES in December, 1940, as indicated by sales of internal revenue stamps, totaled 28,133,550 lb., about 22 percent above sales in December, 1939. For the year 1940, sales totaled 317,875,000 lb., about 7 percent over 1939 sales.

EGG PRODUCTION on farms reached an all-time high for Feb. 1 of 33.9 eggs per 100 laying hens, contrasting with a 1930-1939 average of 26.8 eggs.

EGG PRODUCTION in 1940 was 38,892 million eggs, 2 percent above 1939 output.

BEER PRODUCTION in 1940 is estimated at 53,675,767 bbl., 2.6 percent lower than 1939 production.

FRUITS, frozen, in storage on Feb. 1, 1941, totaled 128,153,000 lb., compared to 117,340,000 lb. a year before and to an average in 1936-1940 of 98,363,000 lb. for the date.

VEGETABLES, frozen, in storage on Feb. 1, 1941, amounted to 70,482,000 lb., compared to 67,580,000 lb. on Feb. 1, 1940.

BUTTER, creamery, in storage on Feb. 1 of this year was 29,894,000 lb., compared to 29,189,000 lb. on Feb. 1 of last year and to an average of 47,198,000 lb. for the date of 1936-1940.

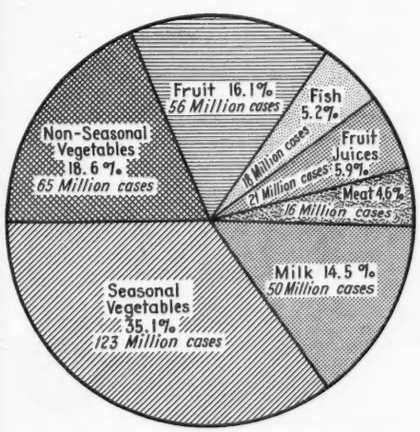
CHEESE, all kinds, in storage Feb. 1, 1941, totaled 123,266,000 lb. The figure a year ago was 94,295,000 lb. and the Feb. 1 average in 1936-1940 was 97,441,000 lb.

EGGS, case equivalent, in storage Feb. 1, 1941, amounted to 1,851,000 cases, compared to 1,664,000 cases a year before and to an average in 1936-1940 of 1,947,000 cases for the date.

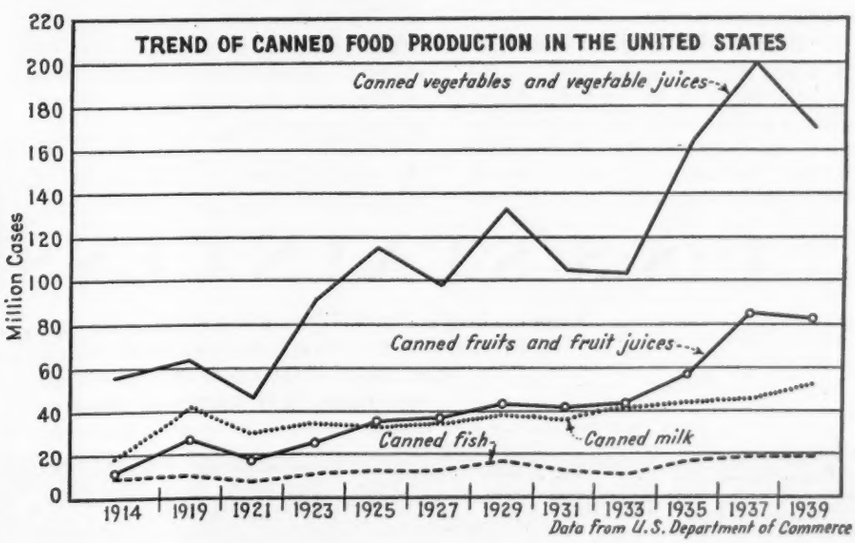
POULTRY, frozen, all kinds, in storage Feb. 1, 1941, totaled 191,648,000 lb., compared to 166,962,000 lb. a year before and to an average in 1936-1940 of 139,547,000 lb. for the date.

MEAT, all kinds, in cure and frozen storage on Feb. 1 this year was 952,538,000 lb. The figure a year before was 775,268,000 lb. and the 1936-1940 average for Feb. 1 was 763,280,000 lb.

LARD IN STORAGE on Feb. 1, 1941, totaled 300,506,000 lb., compared to 202,175,000 lb. on Feb. 1, 1940, and to an average of 138,390,000 lb. for the date in 1936-1940. Note that the total this year excludes 6,875,000 lb. of rendered pork fat, included with lard in figures for prior years.

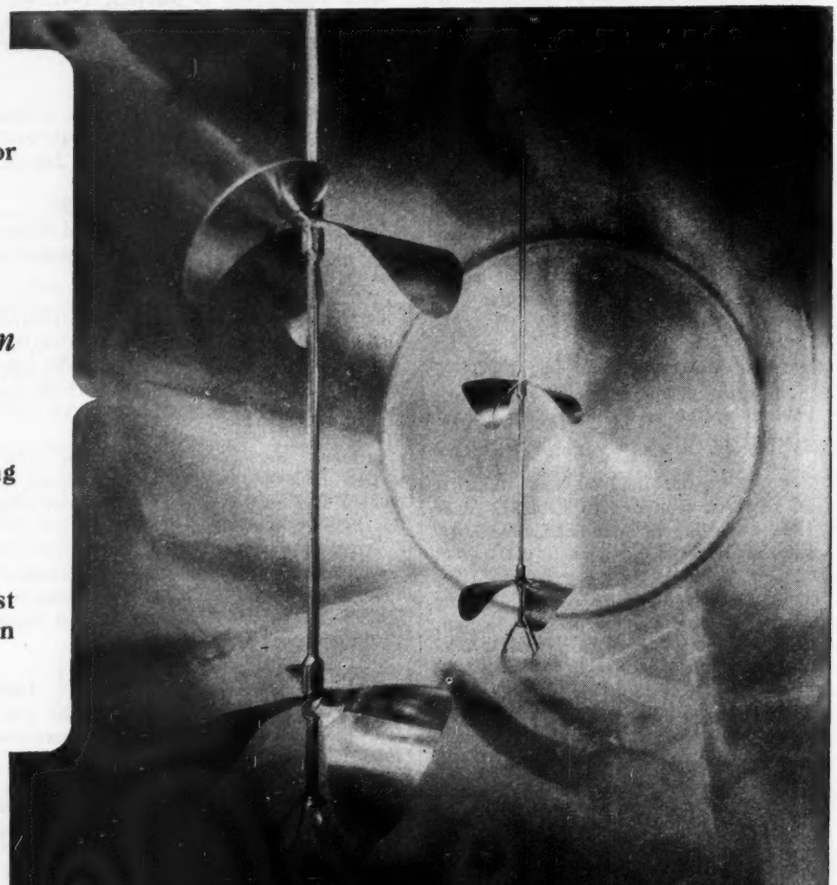


Distribution of U. S. canned food packs, based on 1937-1939 three year average. Data from U. S. Department of Commerce.



WHAT Stainless MEANS TO FOOD INDUSTRIES

1. *Cleanliness*
   fewer lodging places for bacteria.
2. *Better taste*
   no metallic flavor.
3. *Ends contamination*
   from rust and corrosion.
4. *Faster cleaning*
   saves hours of cleaning time.
5. *Longer life*
   for equipment, less cost for repairs, more time in service.



AGITATORS OF U·S·S STAINLESS STEEL in a 6000 gallon tank of the same material. The gleaming hard surface of stainless steel offers little foothold for bacteria, prevents metallic taste in the food.

IT'S a long distance from the start of a food product to the dinner table — but that ride can be kept more sanitary by the use of stainless steel equipment all along the line.

The stainless tank shown here is only one link in obtaining sweet, pure food. The other equipment, such as mixers, coolers, cans, pasteurizers, pipe lines, package fillers and tank trucks must be equally sanitary to maintain cleanliness.

U·S·S Stainless Steel has had rapid acceptance by the food industry because it is so easy to clean. It stays bright year after year without a sign of corrosion. No metallic taste or contamination ever comes from U·S·S Stainless.

Properly designed equipment made of U·S·S Stainless Steel offers little chance for dirt to accumulate. The rounded corners make cleaning fast and certain. They eliminate breeding places for bacteria.

Look over your plant now. Is there any unsanitary equipment that would be better made of U·S·S Stainless? A systematic check-up often uncovers a faulty machine that ruins the good work of the other equipment.

We'll gladly supply you with the names of fabricators of quality equipment made to the "stainless standard." Just write to any of the companies below.

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

Men, Jobs & Companies

INDUSTRY

Amendt Milling Co., Monroe, Mich., suffered loss of flour, corn meal and cereal stores and damage to milling machines in a fire which recently swept the four-story building.

A. & P. will lease a new $500,000 bakery, produce and meat storage building in Maspeth, L. I.

Beech-Nut Packing Co. will award contracts for two additions to its plant at Canajoharie, N. Y., in a current expansion program of $50,000.

Campbell Soup Co., Camden, N. J., is building, as an addition to its tomato pulp plant, a new two-story building, 84x120 ft., of reinforced concrete and steel construction.

Coca-Cola Bottling Co. plans to build a $275,000 bottling plant in Brighton, Mass. The company has also begun construction on its new and fourth plant in Chicago, with cost of land, building and equipment estimated at $500,000. The main two-story building will be 173x175 ft. with an adjoining 150-truck garage of the same size.

Cranberry Canners, Inc., packer of "Ocean Spray" cranberry sauce, has just purchased a factory in North Chicago to be used in packing cranberry sauce for the mid-western trade.

R. Domont & Sons, Pepsi-Cola bottlers and distributors for central Indiana, will move into their new $250,000 plant at Indianapolis around May 1. The building will have 33,000 sq.ft. of floor space. Production capacity is estimated at 340 bottles a minute.

Eastern Shore Baking Co., Olney, Va., has been chartered to conduct a bakery business, with authorized maximum capitalization of $150,000.

General Seafoods Corp., Boston subsidiary of General Foods, will build four diesel fishing trawlers for North Atlantic fishing. The ships will be 147 ft. in length, with 26-ft. beam, 13-ft. draft and 1,000 connected horsepower.

Geneva (Ill.) Bottling Works contemplates the erection of a new bottling plant to cost $75,000 with equipment. It will be a two-story building 88x130 ft.

Greater New York Brewery, Inc., which recently acquired the Horton Pilsner Brewing Co. Inc., has announced acquisition of the City Brewing Corp. of Ridgewood, Queens.

AUSTIN S. IGLEHEART
Executive vice-president of General Foods Corp., he has been named chairman of the executive committee of AGMA.

F. O. BROWN
National Pickle Packers Association elected Mr. Brown, Squire Dingee Co., as 1941 president at their annual convention in Chicago. Lewis Sherman, of Holsum Products Co., is vice-president.

Hawaiian Papaya Co. of Honolulu, packer of "Vita-Sun Papaya Nectar," has introduced two new items, a papaya-pineapple nectar and Guava jam.

The Independent Biscuit Co., Omaha, Neb., has purchased the $50.000 plant in which it has been operating under lease for the past five years.

Johnstown Sanitary Dairy Co., Johnstown, Pa., plans to build a $200,000 milk and dairy products plant.

National Canners Association has allocated in its 1941 budget $40,000 for its labeling committee to consider a consumer survey, and $53,976 for its home economics division to extend consumer relations activities.

Pabst Brewing Co., Milwaukee, is erecting a $35,000 barley cleaning plant as the first step in a $1,000,000 two-year construction program.

Paradise Food Co., Detroit, manufacturer of potato chips, recently had an explosion demolishing the first floor of its two-story building and injuring five employees. Cause of the explosion was attributed to escaping gas.

Pet Milk Co. has begun construction in Martin, Tenn., of a $30,000 milk receiving station with a capacity of 50,000 lb. of milk a day.

Pleasant Valley Packing Co., Schenectady, N. Y., will award contracts for construction of a $100,000 meat packing and distribution plant.

Royal Crown Bottling Co., Chicago, has announced purchase of the one and two story building at 3830 S. Michigan Ave., as a part of a general expansion program.

J. F. Schneider Packing Co. will expend $100,000 in replacing part of its Middlesboro, Ky., packing plant recently destroyed by fire.

Smithfield Packing Co., Inc., of Smithfield, Va., has increased its capital stock from $100,000 to $300,000.

Stokely Brothers & Co., Indianapolis, has leased approximately 15,000 sq.ft. of floor space in a building near their canning plant. The additional space will be used for offices and storage purposes.

Sunrise Creamery, of Cheyenne, Wyo., has purchased the Sunshine Dairy of that city, from J. M. Carey & Brothers. Paul Reiser will be manager of both companies.

United Biscuit Co. of America, with headquarters in Chicago, has purchased the Iten-Barmettler Biscuit Co. at Omaha, Neb., organized in 1938 with $1,000,000 capital stock. The $800,000 model plant is said

Save

PROFITS INCREASE as refrigeration costs decrease.

QUALITY OF YOUR PRODUCTS is dependent on minimum variation in cold storage temperatures.

With so much at stake, *don't gamble!* Install JAMISON-BUILT cold storage doors. They are fast acting—their sealing qualities are incomparable—they protect your products to the same degree as the walls of your storage—AND, they cost no more!!

For details see page 52 of Food Industries Catalogs and Directory, consult our nearest branch, or address JAMISON COLD STORAGE DOOR CO., Hagerstown, Maryland.

Jamison, Stevenson and Victor Doors

Jamison Track Door. See Bulletin 124

JAMISON-
BUILT COLD STORAGE DOORS

to be one of the most modern in the world. C. A. Bowman, president of the Merchants Biscuit Co., Denver, Colo., and vice-president of United, has taken charge of the Omaha plant.

United Fruit Co. will build a $30,000 refrigeration plant for storage of green bananas in Brockton, Mass.

PERSONNEL

George M. Bronn has been named president of the Lincoln (Neb.) Packing Co., succeeding George Mechling. E. E. Fanstil was named general manager.

William P. Butler, plant manager of the Kellogg Co., Battle Creek, Mich., has been elected vice-president in charge of production for the company.

L. M. Gambill has been promoted to manager of the Welch, W. Va., plant of Purity Bakers Co., following the death of Samuel Kilburn, manager of the plant since its establishment in 1927.

Clarence Ford, Jr., former advertising agency head, has been elected vice-president and sales manager of Tom Huston Peanut Co., Columbus, Ga.

Curry C. Hall, Portsmouth, Va., has been re-elected president of the Potomac States Bakers' Association.

O. W. Landrum has taken office as manager of the Washington Court House, Ohio, plant of Cudahy Packing Co.

Miles E. Langley, Portland Packing Co., Portland Me., has been re-elected president of the Corn Canners Service Bureau. Re-elected to the position of vice-president was F. E. Brewer of Marshall Canning Co., Marshalltown, Iowa.

George Lupton plans the construction of a $100,000 soft drink plant in Richmond, Va.

R. H. MacDonnell, chief chemist of the Quaker Maid division of A. & P., is now Captain MacDonnell, QMC, in the procurement division. He is in charge of the QMC laboratory in Chicago.

J. C. Massenburg, Dallas, Tex., has been re-elected president of Texas State Bottlers Association. Veazey Rainwater, Jr., of Beaumont is secretary.

Rudolf Meisner, Wausau, has been elected president of the Wisconsin Bottlers of Carbonated Beverages.

Edwin N. Rausch, West Allis, Wis., has been elected secretary of Milwaukee Co-operative Milk Producers, succeeding Charles F. Dineen.

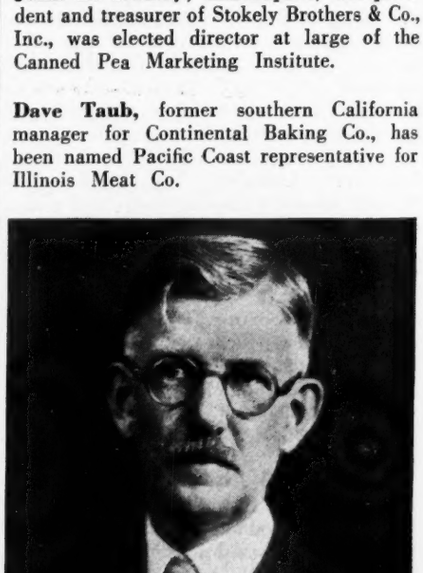
Dr. Oscar Skovolt, who is with Quality Bakers of America, was recently honored by the American Association of Cereal Chemists in recognition of his many years service as treasurer of the organization. He was presented with a parchment and a gift certificate at a meeting of the New York chapter of the association.

John B. Stokely, Indianapolis, vice-president and treasurer of Stokely Brothers & Co., Inc., was elected director at large of the Canned Pea Marketing Institute.

Dave Taub, former southern California manager for Continental Baking Co., has been named Pacific Coast representative for Illinois Meat Co.

CLAUDE F. DAVIS

Mr. Davis has been appointed chief chemist and director of Michigan Bakeries Laboratory, with headquarters in Grand Rapids, Mich. He is president of the American Association of Cereal Chemists and a member of American Society of Bakery Engineers. Mr. Davis was for 15 years chief chemist of a laboratory serving flour mills in the Middle West.



DR. WALTER H. EDDY

Dr. Eddy, director of the Good Housekeeping Bureau since 1927, has resigned to open the Eddy Research Laboratories at 409 East 47 St., New York City. Dr. Eddy has been professor of physiological chemistry at Columbia University since 1919 and is chairman of the food and nutrition section of American Public Health Association.

DEATHS

Hugh C. Anderson, 69, vice-president and director of H. J. Heinz Co., Jan. 23, at Pittsburgh. He had been associated with the company 54 years.

Thomas M. Arden, 60, manager of Pillsbury Flour Mills Co., Jan. 21, at Jacksonville, Fla.

Howard Heinz, 63, president of the H. J. Heinz Co. and son of the founder, Feb. 9, at Pittsburgh. During his active service with the company he expanded their trade operations to many principal world markets. Mr. Heinz was at one time head of the National Industrial Planning Board.

James M. McIntosh, 58, one of the pioneers in the frozen fruits industry, Jan. 20, at Geneva, N. Y. He conceived the idea of frozen fruits as commercial commodities and organized factories in Geneva, Newfane, N. Y., and North East, Pa.

August E. Rehme, president of the Coca-Cola Bottling Co. of Shelbyville, Ind., which he helped to found in 1917, recently.

Joseph P. Stier, 60, secretary and general manager of the Peoples Brewing Co. for the past 25 years, Feb. 3, in Oshkosh, Wis.

ASSOCIATED INDUSTRIES

Air Reduction Co., Inc., has elected as a director Thomas McCabe, president of Scott Paper Co. and a director of the Brunswick Pulp and Paper Co.

Continental Can Co., Inc., has begun construction of a storage addition to its Los Angeles plant. The two-story structure, 140x200 ft., is part of the Continental $25,000,000 three-year expansion program.

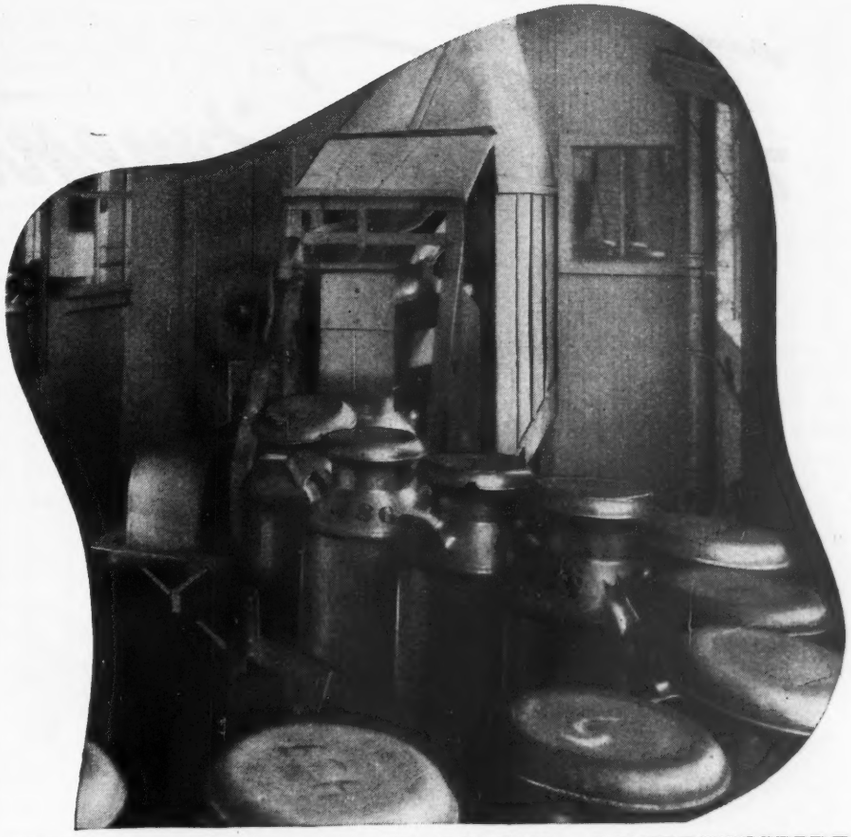
Coppus Engineering Corp. reports the appointment of Edwin L. Dennis, chief combustion engineer, to the faculty of Louisiana State University. Mr. Dennis retains his connection with Coppus.

Jessop Steel Co., Washington, Pa., is establishing a new branch office and fully equipped warehouse in Detroit. The company recently established a new warehouse in Cleveland.

Monsanto Chemical Co. has promoted Dr. Richard M. Hitchens from group leader in the organic chemicals division research department to assistant research director.

Roller-Smith Co., Bethlehem, Pa., has named the John W. Clarke Co. as representative for the Chicago territory.

Ryerson Steel Co. has announced the appointment of James M. Mead, former assistant manager, as its Philadelphia plant manager.



WHETHER IT'S TIN OR ALUMINUM

Metso is Safer!

A MID-WESTERN CREAMERY

preserved the lustre of aluminum cans in active service for over 3 years with Metso Cleaner.

Tin and aluminum are attacked by practically every alkali except the *silicates.* So Metso Silicate Cleaners offer specific protective action upon your metal equipment and containers. Of course, grease and dirt are thoroughly removed.

Use Metso in your plant for cleaning, and save on costly replacements and reconditioning. May we talk over a comparative trial ?

Metso Cleaners (Sodium Metasilicate & Sodium Sesquisilicate) originated and developed by

PHILADELPHIA QUARTZ COMPANY

EST. 1831

General Offices: 125 S. Third St., Philadelphia. Chicago Sales Office: 205 W. Wacker Dr. Stocks in 60 cities. Sold in Canada by National Silicates Ltd., Toronto.

METSO CLEANERS

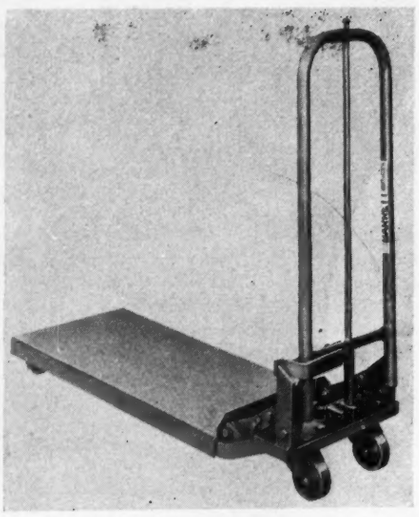
METSO

Food Equipment News

Hand Lift Truck

A BALL BEARING LIFT TRUCK, capable of handling loads up to 1,000 lb., and which can be used with or without skid platforms, has been developed by Barrett-Cravens Co., 2350 W. 30th St., Chicago. In order that this truck may be used without skids, it is equipped with a sheet metal load carrying deck.

The truck is available in platform heights of 3½ in., 6 in., 7 in. and 9 in. Width of truck is 18 in. and it has a lift of 2 in.

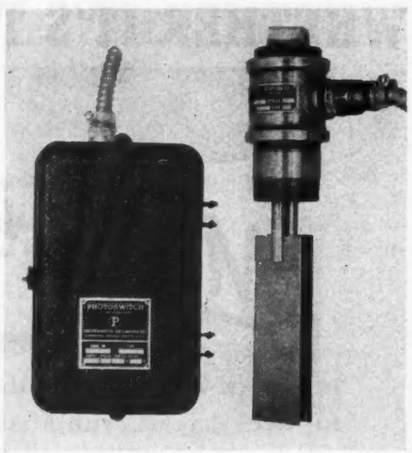


Lift truck for ½-ton load.

Level Controller

PHOTOSWITCH, INC., 21 Chestnut St., Cambridge, Mass, has introduced the electronic level control Photoswitch, Type P 30, an electronic relay for level control of both conductive and non-conductive fluids and powders. This equipment is available to meet various specifications including single level control, on and off control at two levels, boiler feed water control, and tank condensate signals. Installation only requires the attachment of a probe fitting to the surface of the tank.

For two-level control, probe fittings or electrodes are attached to the tank at levels representing the low point where pumping starts and the high point where pumping stops. These probes are wired to the electronic level control. When the liquid level falls below the lower probe, the control closes the circuit which starts the pump and the tank is filled. When the level rises to the upper probe, the fluid itself acts as a conductor of the small amount of current necessary to operate the control which in turn opens the pump control circuit and stops the pump.



Electronic level control device.

Cone-Shaped Bag

THOMAS M. ROYAL & Co., 7th and Grange Sts., Philadelphia, Pa., has brought out a cone-shaped bag of transparent cellulose sheeting for use in packaging the hard-to-package items. With this cone-shaped bag, as shown in the photograph, odd shaped items can be made into trim and well-appearing packages.

These bags are available with sides cut on any angle up to 45 deg. By varying the side angles it is possible to package products that would fit awkwardly or not at all into the usual square bag. Products of round or flat surface and of practically any thickness can be accommodated. Both ends of the bag can be heat-sealed after filling.

General purpose polyphase induction motor.

Cone-shaped transparent bag for packaging.

Polyphase Induction Motors

GENERAL ELECTRIC Co., Schenectady, N. Y., has brought out an entire line of completely new general purpose polyphase induction motors. Known as the "Tri-Clad" motor, this new development features more complete protection than heretofore available except in special enclosed motors, advances in the insulation of current carrying parts. improved bearing design and lubricating arrangements, and improved appearance. It also incorporates a cast-aluminum rotor and a pressure-relief system of greasing for ball-bearing motors.

Among the advantages claimed for this motor a feature is the cast iron box frame with end shields matching and enclosed above the center line. The purpose of this construction is to protect the motor from foreign substances and from rough usage. The new insulation, dust-tight bearings and the use of Glyptal paint guard this motor against corrosive attack.

Freezing Machine

A DEVICE for freezing liquid food products in very brief time has been perfected and is now being marketed by Insta-Freeze Sales Corp., Room 3108, Empire State Bldg., New York City. Essentially, this machine consists of a small refrigerated cylinder in which a specially designed rotor operates at high speed. The cylinder is placed in vertical position and the liquid to be frozen is fed into the top of the cylinder in the space between the cylinder and the rotor. This method of feeding causes the liquid to be dispersed into a very fine spray which instantly freezes as it drops down through the freezing chamber or cylinder which is maintained at temperatures from −5 to −20 deg. F., depending upon the liquid being frozen. The rotor operates at a speed of 1750 r.p.m., and its rotation imparts to the spray a vertical downward whirling motion which causes the frozen particles to be concentrated and discharged at the bottom of the cylinder with a smooth consistency similar to that of a hardened sherbet or ice cream.

The rotor of this machine is operated by an independent motor set in the head of the machine above the freezing cylinder. The freezing cylinder and motor assembly is mounted on a cabinet which contains the compression machine for providing refrigeration for freezing purposes. This freezing equipment is suitable for two purposes. First it can be used for supplying frozen fruit juices, ice creams, desserts and similar products for retail sale or for institutional use in individual portions up to 6 oz. each. As the time of freezing of any single portion is only a few seconds, the production of one or two of these machines is sufficient to supply considerable demand. As an example, one of the accompanying illustrations shows two of the machines that were experimentally operated last summer at the San Francisco World's Fair, supplying frozen orange juice at the Sunkist Orange booth in the food exhibit.

The other purpose of this machine is for laboratory work in solving experimentally problems facing the manufacturer of ice cream and other similar products. Here it is particularly useful in the constant testing of flavors in the finished product. Its small capacity, providing for samples as small as 3 or 4 oz., and its short freezing time permits quick testing of various formulas and flavors. It is also useful for testing the application of refrigeration to such products as fruit and vegetable juices.

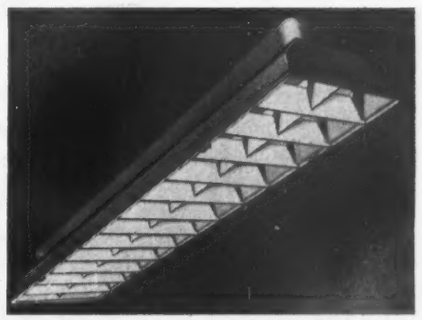
New Circuit Breaker

IMPROVEMENT in circuit protection is the object of a new small circuit breaker recently developed by Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Designed primarily for the protection of lighting, appliance, and motor circuits, this "Quicklag" breaker is said to introduce a new principle of circuit protection. It combines in a single unit a cooperative magnetic and a thermal trip. The combination of the bimetal thermal and the magnetic trip action gives the advantage of instantaneous trip on short circuits combined with time delay for momentary overloads such as those caused by lamp, appliance or motor inrush current. The thermal action is designed to take care of inrush current for all of the common combinations without causing an unnecessary service outage. The magnetic action gives instantaneous circuit opening for all short circuits, even those in the lower ranges—down to 200 amperes.

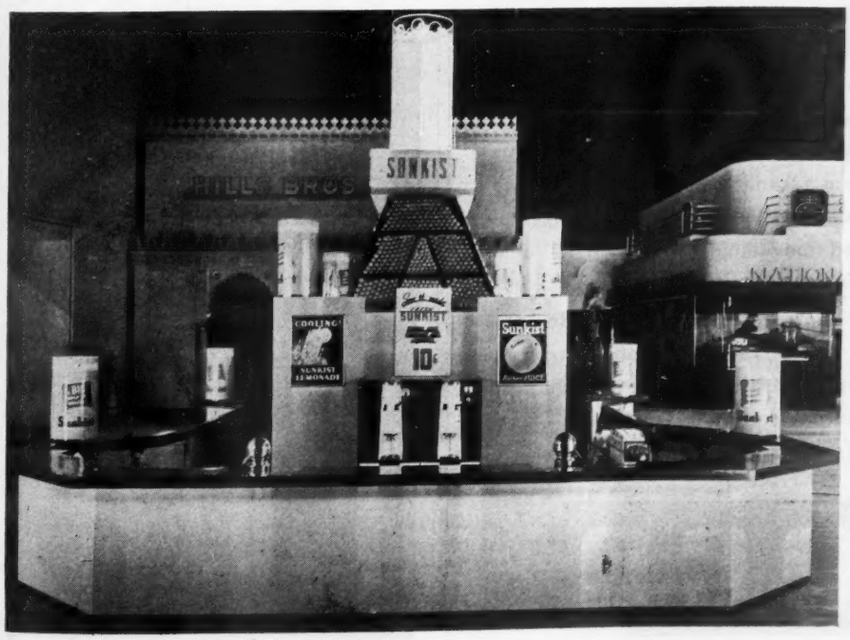
These breakers are available in ratings of 15 to 35 amp., single pole only, for 250 volts a.c. and 125 volts d.c.

Lighting Fixture

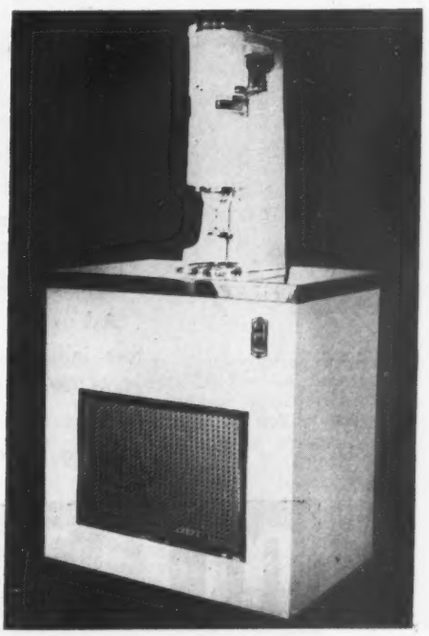
BENJAMIN ELECTRIC MFG. CO., Des Plaines, Ill., has brought out a two- and three-lamp fixture for fluorescent lamp called the "StreamLighter." This fixture is provided with louvres as an accessory which can be attached for increasing the shielding angle to approximately 23 deg. in all directions. The purpose of this is to provide additional shielding of the long lamps used in these



Fluorescent lighting fixtures with louvres.



Two Insta-Freeze machines installed at the booth of the Sunkist Orange exhibit at the San Francisco World's Fair.



Insta-Freeze machine for the rapid freezing of small portions of liquid products.

REMOTE TEMPERATURE READINGS

MOTOCO Model F 1 Dial Thermometer
$20 List Price

MOTOCO Indicating Thermometers have rigid stem for direct mounting or capillary tubing for remote reading.

IMPROVE *and* SAFEGUARD
MEATS
•
FISH
•
POULTRY
•
FROZEN FOODS
•
SOUPS
•
BUTTER
•
CHEESE
•
CONFECTIONERY
•
BEVERAGES
•
BAKERY PRODUCTS

MOTOCO Indicating Thermometers permit eye-level observations. Temperature can be checked quickly . . . conveniently . . . systematically.

Use MOTOCO Indicating Thermometers wherever proper processing depends upon close regulation of temperature.

Their use helps to avoid excessive heating and cooling costs . . . safeguards against spoilage . . . prevents production tie-ups from temperature variations.

MOTOCO Indicating Thermometers have easily read, evenly calibrated dials—the indicating head may be mounted where observation is most convenient, at some distance, if necessary, from where the temperature is taken. MOTOCO Thermometers are strongly made, give accurate service; they have solid liquid filled movement, and have no gears, pinions or delicate hair springs to get out of order.

Ask us now to show you how MOTOCO temperature indication can serve most profitably in your plant. Write to: Moto Meter Gauge & Equipment Division, The Electric Auto-Lite Company, Chrysler Building, New York, N. Y.

MOTOCO
INDUSTRIAL THERMOMETERS

fixtures, in order to achieve greater comfort and freedom from glare in laboratories, offices and other working spaces. The manufacturer states that the use of these louvres is particularly effective in installations comprising long parallel rows of units mounted end to end, as the louvres shield the great expanse of lamps when one looks down the rows. The louvres are of steel, designed in the so-called "egg crate" construction and finished in high reflective white enamels. They are welded into a rigid assembly and have a frame rail which fits into the rim of the reflectors.

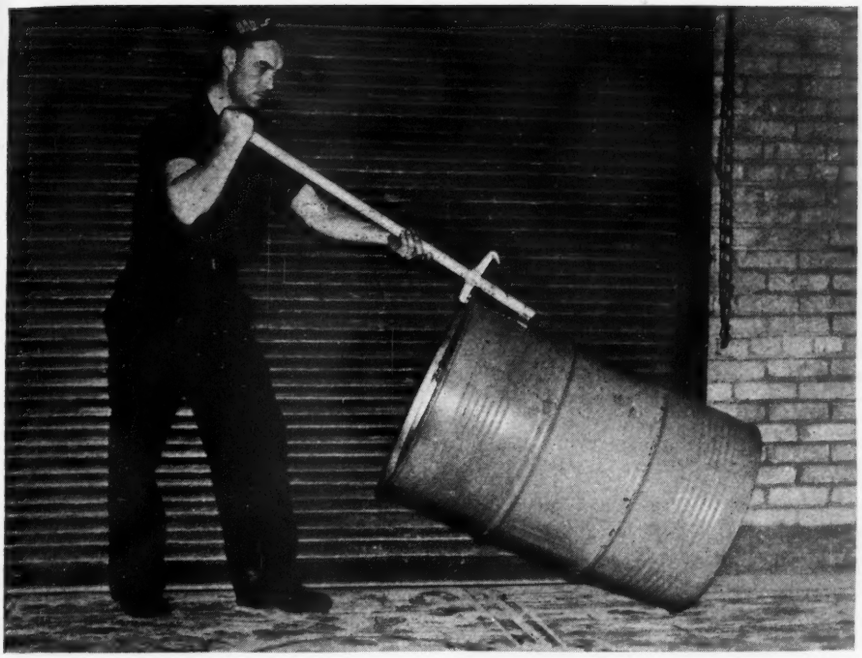
Light Air-Powered Hoist

INGERSOLL-RAND Co., 11 Broadway, New York City, has introduced the "Air-Bloc" for hoisting light loads up to 700 lb. This is a flexible, welded, link-chain air-powered hoist, designed for light lifting jobs of all types. It is available in three sizes, to handle loads of 300, 500 and 700 lb. respectively. Its weight is less than 75 lb. and it is easily portable. An up-and-down stop automatic control is provided to prevent damage to the hoist from over-run of the chain in either direction. Safety stop prevents the load from dropping if the air supply fails.

Straight Aluminum Ladder

ALUMINUM LADDER Co., Tarentum, Pa. has brought out a straight aluminum ladder that weighs only 1 lb. per foot. This ladder is made of Aluminum Alloy 61 S.T. and has a tensile strength of 48,000 lb. per sq.in. Its side rails and ¾ in. round rungs are said to be sufficiently strong to support the heaviest

Light-weight aluminum ladder.



Handy tipping device for use with barrels or drums.

workman in complete safety. It is available in sizes up to 16 in. wide and 20 ft. long and can be equipped with safety shoes if desired. Easy portability, strong construction and low first cost are the advantages claimed by the maker for this product.

New Motors

General Electric Co., Schenectady, N. Y., has recently developed two new lines of motors. The first of these comprises a line of triple voltage motors for driving air compressors used in air conditioning and refrigeration work. These motors are ordinarily supplied for 199, 208, and 220 volt operation. They will provide three different torques, depending upon how the leads are connected at the terminal board for a given line voltage. Advantages claimed for these motors in air conditioning and refrigeration work include: proper torque to meet requirements of individual application; operation on the voltage available at the compressor, whether it be 199, 208 or 220 volts; more flexibility in making installations; and a material decrease in the number of stock motors necessary for different applications in these fields.

The other line of motors comprises a d.c. line featuring compactness and improved protection. In these motors the frame, end shield and bearing bracket construction are combined to give protection from external damage. Also, the use of "Formex" wire coils and a specially developed Glyptal insulating varnish provide high resistance to impact abrasion and the action of foreign materials. In this line, open motors are available in constant speed ratings from ½ hp. at 850 r.p.m. up to and including 60 hp. at 1,750 r.p.m.; and in adjustable speed ratings from ½ hp. at 850–3,400 r.p.m. up to and including 15 hp. at 500–1,800 r.p.m.

Drum Tipper

Lewis-Shepard Sales Corp., 259 Walnut St., Watertown, Mass., has developed a device for tipping drums and barrels safely for emptying purposes. This device consists of a handle upon which is adjustably mounted a pronged collar. The adjustable collar allows the operator to fit the tipper to all types of drums and large or small bilged barrels. Through the use of this tipper, the operator can quickly and safely tip the drums from a horizontal to a vertical position or the reverse. The long handle is designed to increase the leverage and reduce the effort required to handle the barrels or drums.

Sanitary Motor

Howell Electric Motor Co., Howell, Mich., has developed a sanitary motor designed to meet the most exacting requirements of the dairy and other food industries. The construction of the motor is designed to be proof against vermin, dirt and clogging. It is of the totally inclosed, non-ventilating type and the drain hole in the bottom of the motor

NEW Automatic Discharge

ELEC-TRI-PAK

Sets Production Pace!

SPECIFICATIONS
Range—¼ lb. to 5 lbs.
Production—15 to 25 per min.
Accuracy—Exact to ⅛ oz. plus or minus
Floor Space—3' x 9'

DESIGNED for weighing and filling food products into bags, the new Model N-2-A Vibratory Feed ELEC-TRI-PAK Weigher with conveyor is tops for rapid, accurate work. The automatic discharge sets the production pace for the operator. Other features include: instant hand wheel speed change; self-cleaning; absolutely no discharge of "short-weight"; provision for balance scale for visible weighing information (no operator required for scale and it is *not* needed as a check weighing device); the exclusive Triangle bulk and dribble vibratory feed; gentle handling which eliminates damage to products! Write for complete details today!

HOW IT WORKS! NEW MODELS!
Write today for complete descriptive literature describing the vibratory feed principle and 6 new ELEC-TRI-PAK models for every weighing job!

TRIANGLE PACKAGE MACHINERY CO.
900 NO. SPAULDING AVENUE, CHICAGO
Representatives in Principal Centers

I'D LIKE TO SEE YOU FOR JUST A MOMENT"....

I want to stop long enough to refresh your memory on these vital Viking facts:

All Viking Rotary Pumps operate with only 2 moving parts —here is longer-life, less wear, simple servicing, lower power costs. Compactly designed, Viking Pumps fit snugly in tight places, require less floor space, give a neater installation. A wide selection of drive arrangements, mountings and capacities are available in all standard stock models.

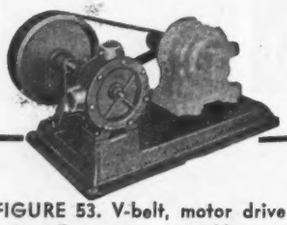


FIGURE 53. V-belt, motor driven unit. Operates smoothly and quietly. Furnished in iron, bronze-fitted or all bronze construction. Available in capacities from 5 to 1050 GPM. Belt guard is standard equipment. Bulletin 103-35 shows both portable and stationary models. Write for a copy.

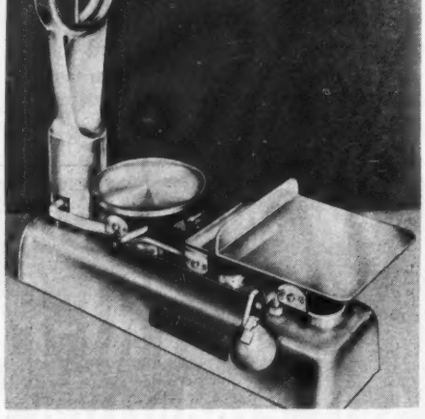
VIKING
PUMP COMPANY
CEDAR FALLS, IOWA

for disposing of condensation is fitted with a fine mesh stainless steel screen. The motor is designed so as to be easy to keep clean, with sharp corners, pockets and crevices avoided and with all external surfaces finished smooth. Windings are specially insulated to be highly resistant to both water and heat.

This motor is equipped with ball bearing cartridge units, prelubricated and sealed. External lubrication can be furnished, if desired. The motors are now available in sizes up to 3 hp. and larger sizes will be available later.

Super-Speed Scale

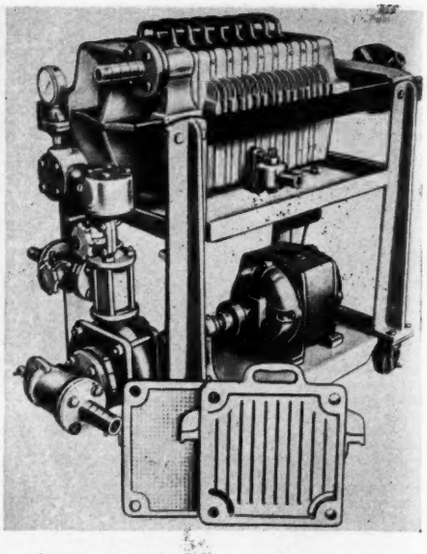
AN ALUMINUM "SUPER-SPEED" SCALE has been developed by Detecto Scales, Inc., Main and Water Sts., Brooklyn, N. Y., to be added to their regular line of Detectogram equipment. This scale is designed to speed up weighing without sacrificing accuracy. The manufacturer claims that the unit is two to three times as fast as ordinary standard production line scales. It is available with various types of scoop or commodity plates as required for different applications. The tower has been placed in an end position to give compact construction.



High speed scale for production line weighing.

Quick Cleaning Filter

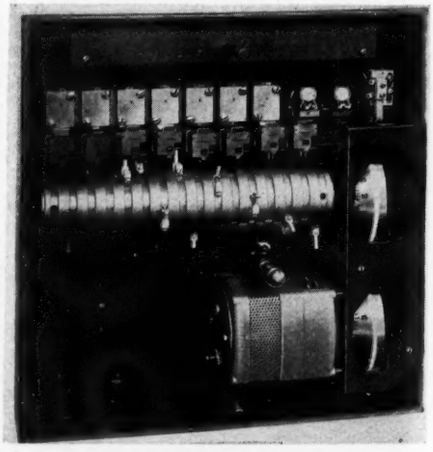
T. SHRIVER & CO., Harrison, N. J., has developed a quick-cleaning filter press. In general this is like the usual plate and frame pressure filter in design. However, a special frame provided with ribs for supporting the filter cloth permits pressure to be applied from behind. When the filter chambers are full of solids, filtration is stopped and the remaining liquid drained off. Then water at from 30 to 50 lb. pressure is introduced and the drain cocks in the frames are opened. This causes a sudden flow of the water backwards through the filter cloth, loosening the cake and washing it out as a thin slurry to the drain cock. Short surges of sluicing water, filling each chamber and then released by opening each trap in turn, effect a quick removal of filter cake. When this sluicing operation is completed, the filter is cleaned and another filtration cycle can be started at once.



Quick cleaning plate and frame filter.

Operation Controller

TAYLOR INSTRUMENT COS., Rochester, N. Y., has developed a device called the "Flex-O-Timer" for the purpose of giving precise timing of the sequence and duration of operation involved in use of temperature, pressure, humidity or combinations of these in processing work. This timer is adaptable for all-electric or all-pneumatic operations, or for com-



Device for precise timing of sequence and duration of processing operation.

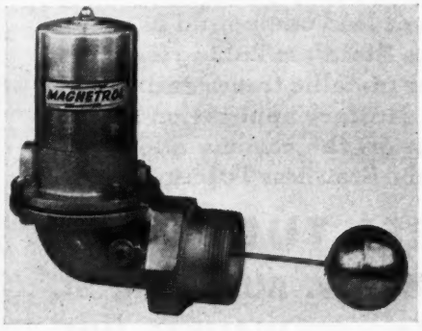
binations of the two. Where the diversity of the products being processed requires considerable variation in processing time, a varying drum speed rotation is offered, in which 78 different drum speeds are available from each gear train ratio. Yet the drum speed is fixed and positive for any given setting and can vary only as the frequency of the electrical supply changes. Models are also available with a fixed speed gear train.

Rust Preventives

A NEW SERIES of rust preventives including liquid rust inhibiting, non-drying products, developed from a new base, has been announced by E. F. Houghton & Co., 3rd and Somerset Sts., Philadelphia, Pa. This series includes grease-type, (non-drying products); drying, hard-film products; semi-drying waxy film products and soluble products. The new base material provides a homogeneous non-crystalline film that is said to have a high degree of cohesion as well as adhesion to metal. It wets out the surface rapidly.

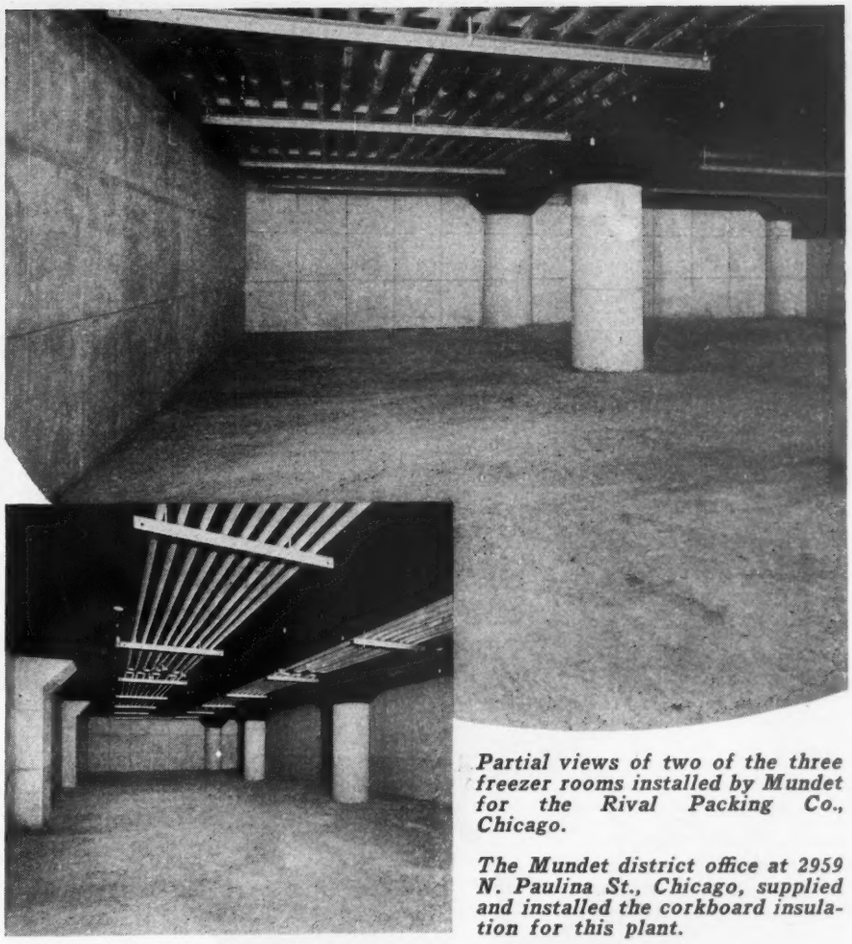
Liquid Level Controls

FRED H. SCHAUB ENGINEERING CO., 325 W. Huron St., Chicago, has developed new "Magnetrol" liquid level controls.



Liquid level control designed for use with tanks or vats.

Known as Models TF-5 and TF-6, for flange and screw-in mountings respectively, these controls are for application to tanks or vats where it is desired to maintain a liquid level within a certain differential. Being electrically operated, they may be used to energize a pump, solenoid valve or motorized valve, depending upon the application. Also they may be used in connection with an alarm system to flash a light or ring a bell when the liquid level reaches a definite point. In operation, movement of the float causes a switching action produced by magnetic means and does away with the necessity for stuffing boxes, packing and other accessories.



Partial views of two of the three freezer rooms installed by Mundet for the Rival Packing Co., Chicago.

The Mundet district office at 2959 N. Paulina St., Chicago, supplied and installed the corkboard insulation for this plant.

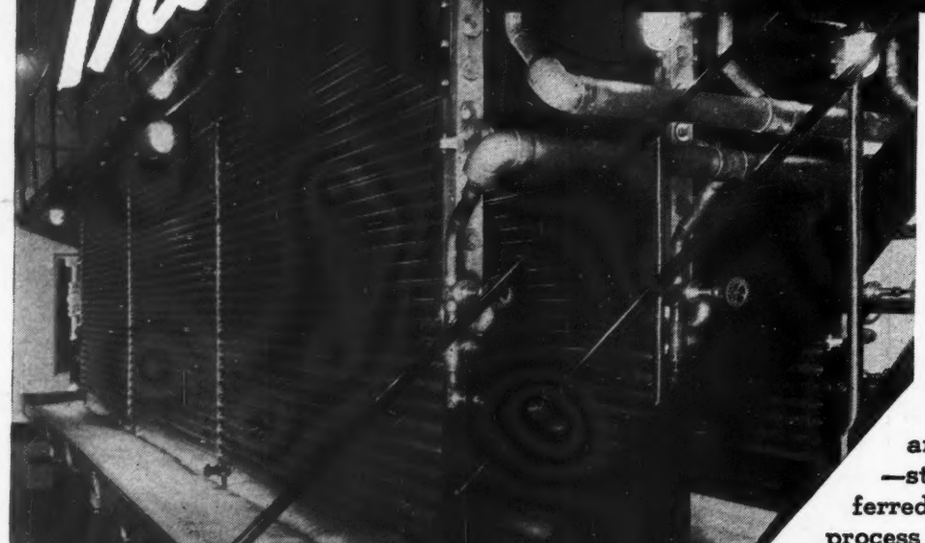
Economical Cold Storage

These cold storage rooms are well prepared to conserve low temperature. Layers of Mundet Cork Insulation in the walls, columns and ceilings make possible the precise and economical control of cold. • In all low temperature operations, Mundet Cork Insulation is a dependable barrier to heat infiltration. Through its efficiency the problems of temperature control are simplified and costs of operation are reduced. • Responsible engineering services covering all phases of low temperature insulation are available through Mundet offices, located in principal cities. Recommendations and estimates are supplied promptly. For helpful data on low temperature insulation, cork specifications and heat loss charts, write today to Mundet Cork Corporation, Insulation Division, 65 S. Eleventh St., Brooklyn, N. Y.

MUNDET
CORK INSULATION

CONSERVES LOW TEMPERATURE

Protect THE PURITY OF YOUR PRODUCT—



Only the bottom ten tubes in the huge beer cooler illustrated above are Globe Stainless Steel. Beer flowing over the upper tubes is cooled by cold water contained in these tubes—but the bottom ten tubes carry a highly corrosive, strong refrigerant which required the high corrosion resistance of Globe Stainless Tubing.

Globe Stainless Steel Tubing—Corrosion and Heat-Resisting—Produced from a Wide Range of Chrome and Chrome Nickel Alloys

To minimize corrosion—to avoid contamination of foods, chemicals, dyes, pharmaceuticals and other process products—stainless steel tubing is preferred by process industries and process equipment manufacturers . . . Cold drawing is essential in the manufacture of stainless steel tubing—but Globe cold drawing is accomplished by an exclusive process, perfected by Globe many years ago, which eliminates the use of lead compound as a lubricant. Result—Globe Stainless Tubing is entirely free of lead or other metallic traces and wholly safe for food or other sanitary application . . . For complete information on the various alloys and types available in Globe Stainless Tubing, write—

GLOBE STEEL TUBES CO.
4005 W. BURNHAM ST.
MILWAUKEE, WIS.

Just off the Press

BOOKLETS · LITERATURE · BULLETINS

Food Plant Equipment

Bake Ovens
Reed Reel Ovens of various sizes are briefly described in a recent four-page bulletin of Bakers Engineering & Equipment Co., 507 West Fifth St., Kansas, City, Mo.

Coolers and Chillers
Refrigerated water cooling and chilling equipment, employing Freon refrigerants, is described in three recent publications of Richmond Engineering Co., 7th and Hospital Sts., Richmond, Va.

Hoisting Equipment
Hand and motor operated chain hoisting equipment, trolleys, chain and other accessories, are described with specifications in Catalog No. G-3 issued by Coffing Hoist Co., Danville, Ill.

Material Handling Equipment
"Cord" rubber conveyor belting and its applications form the subject of an illustrated 12-page booklet recently put out by B. F. Goodrich Co., Akron, Ohio.

Quick-Freezing Equipment
Low temperature systems for the quick-freezing of food products are the subject of illustrated Bulletin 147-A issued by Frick Co., Waynesboro, Pa.

Refrigerating Equipment
In Bulletin No. 112-G, inclosed type ammonia compressors are described and their applications discussed by Frick Co., Waynesboro, Pa.

Smoking Equipment
"Three Operations in One" is the title of an illustrated folder describing air conditioned smoke-houses for meat smoking, issued by Carrier Corp., Syracuse, N. Y.

Plant Supplies

Blowers
Type G, "MotorBlower," a unit in which blower and motor are mounted on one base for pressures from 8 to 36 oz., and capacities up to 2600 cu.ft. per min., is described in bulletin Form 2671, of Ingersoll-Rand Co., 11 Broadway, New York City.

Factory Lighting
"How to Design Fluorescent Lighting" is the title of a new design manual which can be obtained from Westinghouse Lamp Division, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., at a cost of 7 cents per copy.

Floor Cleaning Equipment
The Tennant system of cleaning factory floors, and equipment used for the purpose, are described in recent bulletins published by G. H. Tennant Co., 2530 N. 2nd St., Minneapolis, Minn.

Ice-Making Equipment
The use of positive displacement blowers for the aeration of water used in ice-making, is described in bulletin No. R-5341, of Roots-Connersville Blower Corp., Connersville, Ind.

Valves
A general catalog of bronze and iron body valves for low, standard and high pressures, of screwed and flange fittings, flanges, and specialties, containing 240 pages with illustrations and specifications, has been issued by Kennedy Valve Mfg. Co., Elmira, N. Y.

Water Coolers
Jacket-type water coolers and heat exchangers are described, with a table of dimensions, in Bulletin W-100 of Condenser Service & Engineering Co., Hoboken, N. J.

Water Treating Equipment
Pressure filters for water purification, and hot process water softening equipment, are described respectively in Bulletins W-210-B26 and W-210-B27 issued by Worthington Pump & Machinery Corp., Harrison, N. J.

Packaging

Packaging
In an illustrated bulletin, interleaved with samples of the product, the materials, processes, products, services and personnel of Shellmar Products Co., Mt. Vernon, Ohio, are described for those interested in the packaging of food in transparent, printed wraps.

Control Equipment

Control Equipment
Electrical control equipment is described in the following Bulletins: GEA-3191, describing a.c. magnetic control for material handling and other equipment; GEA-2963B describing Type TSA-14 time switches for the control of a.c. circuits, and GEA-1755C describing photoelectric relays and accessories. All these have been issued by General Electric Co., Schenectady, N. Y.

Control Equipment
"American Temperature and Pressure Controllers" is the title of a new 84-page catalog and textbook on controllers of various types and their operation and application, including such accessories as diaphragm motor valves, issued by American Schaefer & Budenberg Instrument Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

Control Equipment
A complete line of indicating, recording and controlling instruments of electrically operated types are described in the new general catalog of Wheelco Instrument Co., 1929 S. Halsted St., Chicago, Ill.

Control Instruments
Rectangular case thermometers and pressure gages, of vapor-actuated, gas-actuated, mercury actuated and portable types, for indicating, recording and controlling process operations are described in 20-page illustrated Bulletin No. 6706, of Brown Instrument Co., Philadelphia, Pa.

Flow Meter
The "Adsco" flowmeter, a device of the orifice type for metering fluid flow, is described in 4-page illustrated folder No. 140 of American District Steam Co., North Tonawanda, N. Y.

Washing Solution Tester
The Solu-Bridge, a portable instrument for testing the concentration of alkaline solutions used in bottle and can-washing equipment and similar apparatus, has been described in a four-page illustrated bulletin issued by Industrial Instruments, Inc., 156 Culver Ave., Jersey City, N. J.

Construction Materials

Corrosion Resisting Metals
Notes on the mechanical properties and corrosion resistance of "Ni-Resist", a nickel cast iron, are given in Section 3, No. 8 of Nickel Cast Iron Data, published by the International Nickel Co., Inc., 67 Wall St., New York, N. Y.

Sun Screens
A new type of screen for shutting out direct sunlight but permitting light to enter factories, rooms and other spaces, called "Kool-Shade" is described in a recent bulletin of Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago.

Wood Flooring
Sanitary wood flooring for food factories, made of hard maple and laid directly on concrete in a mastic cement is described in a recent folder of Robbins Flooring Co., Rhinelander, Wis.

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

A Correction

Because the abstract "Vinegar an Enemy to Molds" (FOOD INDUSTRIES, November, 1940, page 84) contains an error, we are reprinting it below in corrected form. Please mark your November copy accordingly.—THE EDITORS.

Vinegar as Food Preservative

VINEGAR definitely inhibits food spoilage by microorganisms, doubtless through the toxic action of acetic acid. Since vinegar in foods is commonly accompanied by sugar or salt, or both, the toxicity of acetic acid to microorganisms has been tested in their presence.

Typical food spoilage organisms were selected for tests: *Salmonella aertrycke, Staphylococcus aureus, Phytomonas phaseoli, Bacillus cereus, Saccharomyces cereviseae, Aspergillus niger.* Different strengths of acetic acid were tested in water, 5 percent brine and 20 percent sirup. Results show that toxicity of acetic acid in yeasts, molds and bacteria does not depend solely on acidity (pH). At equivalent pH values, toxicity is usually greater the more acid present. Aside from their indirect action through modifying pH, salt and sugar contribute very little to the toxic action of acetic acid on bacteria and yeast. The inhibiting effect of acetic acid on bacterial growth is almost directly proportional to concentration. With respect to mold growth (*Aspergillus niger*), salt as a 5 percent brine added nothing to the inhibiting action of solutions containing 0.1 to 0.17 percent acetic acid, and 20 percent sugar sirup noticeably promoted growth. Even acetic acid, in nontoxic strengths, serves as a source of energy for mold growth.

Among the bacteria, the descending order of resistance to acetic acid, whether in water, brine or sirup, was: *Bacillus cereus, Salmonella aertrycke, Staphylococcus aureus, Phytomonas phaseoli.* Acid strength was not carried above 0.17 percent with the bacteria, since this concentration was toxic, but for the mold the toxic concentration was 0.27 percent. With the yeast (*Saccharomyces cereviseae*), which is still more resistant, acid strengths were tested up to 4.73 percent, at which there was no growth of the cells.

Digest from "Inhibiting Effect of Acetic Acid Upon Microorganisms in the Presence of Sodium Chloride and Sucrose," by A. S. Levine and C. R. Fellers, *Journal of Bacteriology* 40, 255, 1940.

QUALITY CONTROL

Incubation Temperatures For Bacteria Counts

THE BOSTON BOARD OF HEALTH has adopted 32 deg. C. instead of 37 deg. for incubation in bacterial counts on milk. Grade A milk producers receive a premium on a sliding scale dependent on the bacterial count of their milk. This change in incubation temperature makes a slight difference in Grade A raw-milk counts; some samples give lower counts but rather more of them give higher. The change is not serious enough to justify any alteration of the premium basis. When the quality of a milk supply is judged by the bacterial count after pasteurizing, the 32-deg. C. incubation tends to increase the higher counts still further. Thus supplies needing sanitary attention are shown up more clearly.

Digest from "A Comparison of the Results Obtained from Incubating Bacterial Plates at 32 deg. C. and 37 deg. C. on the Bacterial Counts of Milk," by A. C. Fay and A. W. Howard, *Journal of Dairy Science* 23, 1069, 1940.

Determining the Maturity Of Frozen Peas

A METHOD is proposed for grading frozen peas which is said to be an improvement over the Agricultural Marketing Service method in that "it is less time-consuming, less tedious to run in the laboratory and appears to be more accurate. Like other methods that measure maturity, it does not take into consideration color and appearance defects such as spots and splits.

"It depends upon the determination of the specific gravity of thawed peas by means of the difference between the weight of the sample in air and the weight in a liquid, in this case a mixture of xylene and carbon tetrachloride, the specific gravity of which is 1.000. Xylene alone can be used, if desired, although the calculations are a little less simple. This is a modification of the method of Nichols and Reed devised for use on prunes, which uses a mixture of xylene and carbon tetrachloride of specific gravity 0.900."

Details of the method, including description of the apparatus and sample calculations, are given in the original article.

Abstract of "Determining the Maturity of Frozen Peas—A Rapid Objective Method," by F. A. Lee, *Industrial and Engineering Chemistry,* Analytical Edition, January, 1941, page 38.

BAKING AND MILLING

Vitamin B_1 Enrichment of Bread

IN THE LIGHT of discussion on the relative lack of vitamin B_1 in white bread and the possibility of vitamin B_1 (thiamin) enrichment by adding a special high-thiamin yeast to white bread, diet tests have been made with bread enriched in this manner. The subjects were 17 young women, healthy except for a relatively low hemoglobin level suggestive of secondary anemia. The average urinary thiamin excretion per 24 hours for the group was 106 gamma before the test. The subjects continued their usual diet during a test lasting five weeks, but ate thiamin-enriched white bread instead of the usual white bread to which they were accustomed. At the end of the five weeks the average urinary thiamin excretion per 24 hours was 206 gamma, indicating an improved state of thiamin nutrition. If any anemia existed in these 17 subjects, as indicated by their somewhat subnormal hemoglobin level, it was not such as to yield to increased vitamin B_1 intake, since the hemoglobin level remained the same throughout the test. It is interesting that this same type of anemia (if, indeed, it is anemia) in similar groups also refuses to yield to iron therapy.

Of the 17 subjects, 15 liked the thiamin-enriched bread and two reported that they liked it "as well as any bread."

OUTDO HIS MOTHER AND YOU'RE ACE HIGH WITH *His Wife*

EVEN though her husband smiles when he says, "the food mother used to make," every wise housewife seriously realizes that his mother has created definite food standards that she must meet. Give her products that her family likes—products that retain natural flavor and color, and she will take care of moving your brand from the grocer's shelves.

Because "PYREX" Piping is chemically inert, it does not alter color or flavor. Because it resists thermal shock, it can be flushed safely with hot water or steam. Its transparency permits you to see everything that is happening inside your pipe lines.

If you want a top grade pack—one that makes housewives ask for your brand, don't take chances with your pipe lines. Use "PYREX" brand Industrial Glass. Write for details.

"PYREX" Piping and fittings are available in 1", 1½", 2", 3" and 4" sizes.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass

Increased appetite during the test was reported by six subjects and four said they definitely felt better while taking the enriched bread. No other subjective symptoms were reported.

Digest from "Increase of Vitamin B_1 Intake by the Use of Special High Vitamin B_1 Bread," by Alfred H. Free, *Cereal Chemistry* 17, 725, 1940.

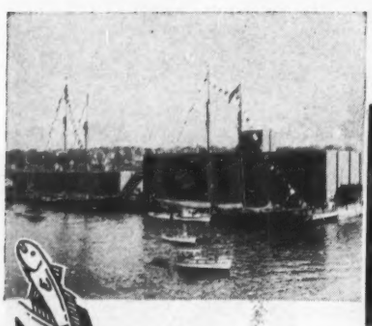
Function of Lipids In Milling and Baking

LIPIDS, the fats and fat-like compounds in wheat, have considerable influence on the keeping quality and baking quality of flour. Wheat germ contains about 15 percent lipids. The lipids of flour are richer in volatile fatty acids than are wheat-germ lipids, and also in unsaponifiable matter. In both, however, the principal saturated fatty acid is palmitic and the principal unsaturated fatty acid is linolic acid.

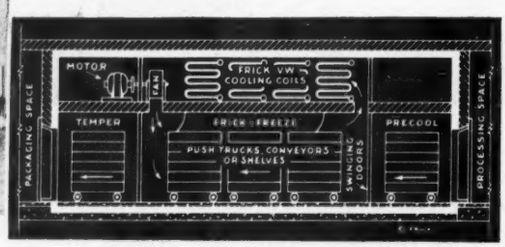
Flour, bran and germ contain lipases which promote hydrolysis of the lipids with liberation of fatty acids, especially under warm, moist conditions. Hence flour must be stored in a cool dry place. Deteriorated flour can be extracted with ether to remove the lipid hydrolysis products, and restored to its original baking quality by admixture with fat extracted from fresh flour. Fat extracted from wheat germ does not give the same restoration, but it does improve the handling quality of the dough. Bran, middlings and germ are subject to similar spoilage by hydrolysis of lipids in a damp atmosphere.

Lipids are sensitive to oxidation as well as to hydrolysis, and through oxidation they impair the baking quality of flour. Unsaturated fatty acids (oleic, linolic and linolenic acids) tend to make the gluten short, tough and brittle when present in more than the normal amounts. When these acids, normally present in flour lipids, are oxidized they decrease loaf volume, rob the dough of elasticity and give it a dead feel to the touch. When these oxidized acids are added to fresh flour they have the same effect as extreme natural aging. Gluten is closely associated with the lipids in flour and owes some of its desirable physical characteristics to their presence. Much research is still needed for clear understanding of the lipid functions.

Digest from "Function of Lipids in Milling and Baking," by B. Sullivan, *Cereal Chemistry* 17, 661, 1940.



The Gloucester (Mass.) Fish Pier Frick-Freezes up to 226,000 Pounds of Fish Daily, Using the System Outlined below.



Frozen Food Producers Prefer

Frick-Freezing Systems

It's a fact that more foods are now being frozen with Frick-Freezing Systems than by any other method.

Why? Because these Frick Systems handle ANY food, in season; they assure the rapid cooling and high relative humidity essential to quality; they save time, labor, and up to 1/3 in power cost.

Bulletin 147, describing Frick-Freezing Systems, is of interest to packers, canners, fisheries, ice and cold storage plants, locker plants, and the growers of fruits, vegetables, poultry and livestock. Just off the press; your copy is waiting. Write

FRICK COMPANY, Waynesboro, Penna.

BEVERAGES

Neutralizing Acid In Grape Juice

TESTS in which grape juice was purposely limed beyond the limit of good flavor showed that the most desirable proportion of free tartaric acid to be left in the juice depends in part on the malic acid content. In general, grape juice contains from 4 to 9 percent tartaric acid, and about 3 percent (or at least 2.5 percent) should be left in it when the juice is neutralized with lime. If a juice with 3 percent tartaric acid still tastes too sour (indicating the presence of a high proportion of malic acid) the only satisfactory way to adjust the acidity is to blend with a low-acid juice. Sugar content is a factor which must also be considered in deciding how much tartaric acid to leave in the juice. When tartaric acid forms a large proportion of the total acidity, special care must be taken to avoid over-neutralization, since malic acid, the principal acid remaining after tartaric acid is removed, is much weaker and tastes much less sour than tartaric acid.

Digest from "Experiments in Removing Acid From Fresh and Pasteurized Grape Juice in Making Unfermented Grape Juice," by A. Widmer and F. Braun, *Landwirtschaftliches Jahrbuch der Schweiz* 54, 416, 1940 (Published in Switzerland).

Blanching Pears for Juice

BLANCHING PEARS by heating 2.5 hours under water at 149 deg. F. removes much of the tannin and some of the acid from the juice. Whether sweet or fermented, the juice from blanched pears is extremely cloudy and much more difficult to filter than juice from raw pears. As a rule the juice from raw pears tends more toward a sparkling fermentation and a clear product. On this basis a treatment is available for making a very mild non-alcoholic drink from extremely sour pears without the necessity of clarifying with gelatin. Thus blanching has its merits, while at the same time careful study of blanching has given useful information for preparation of clear pear juice drinks.

Digest from "Effect of Blanching Very Sour Pears on the Composition and Properties of the Juice and Wine," by A. Widmer, *Landwirtschaftliches Jahrbuch der Schweiz* 54, 410, 1940 (Published in Switzerland).

CANNING

Protecting Pea Seed With Chemical Dusts

SEED FOR CANNING PEAS was tested through four seasons in Wisconsin to

ascertain the benefits of seed fumigation, especially for protection from Ascochyta attack. The fumigants used in these tests were 2 percent "Ceresan" and a mixture of red copper oxide with graphite. Results were not consistent throughout the four seasons, because of differences in rainfall and other conditions, but it appears that smooth varieties, yielding starchy cotyledons, have little or no need of the protection given by these fumigants. On the other hand, wrinkled varieties which yield sugary cotyledons were benefited by seed fumigation. The tests seemingly show that conditions favoring cotyledon decay in germinating peas do not occur every season in Wisconsin and that chemical dusts for fumigating seed are beneficial only when such conditions are present and when the seed is of a susceptible variety. Soil moisture is an important factor in cotyledon decay. Soils in the Sturgeon Bay field benefited more consistently from the chemical dusts than did soils in the Madison field.

Digest from "Pea Seed Treatment with Chemical Dusts," by J. C. Walker, E. J. Delwiche and Paul G. Smith, *Journal of Agricultural Research* **61**, 143, 1940.

DAIRY PRODUCTS

Vitamin C in Milk

VITAMIN C exists in two forms, equally potent biologically, namely ascorbic acid (reduced form) and dehydroascorbic acid (oxidized form). Pasteurizing under normal holding methods reduces the vitamin C content of milk by about 20 percent. Copper, from worn tinned copper pipes for example, promotes the change from ascorbic acid to the dehydro form. It is this latter which is readily destroyed by heat and light. Flash pasteurizing causes less loss than the holding method because time has more effect than temperature in vitamin C destruction.

Homogenization, adding vitamin D concentrate, and the use of sodium metaphosphate or enzyme to produce soft-curd milk, have no effect on vitamin C. It is perfectly feasible to market a commercially pasteurized milk fortified with vitamin C (to bring it up to human-milk strength) *provided all copper contamination is avoided and the milk is marketed in brown glass bottles or waxed paper containers to exclude light.* The only objection is the present cost of synthetic ascorbic acid.

Digest from "The Effect of Commercial Practices on Ascorbic Acid and Dehydroascorbic Acid (Vitamin C) in Milk," by Warren W. Woesnner, K. G. Weckel and Henry A. Schuette, *Journal of Dairy Science* **23**, 1131, 1940.

Solubility of Milk-sugar Compounds

THE SOLUBILITY of milk sugar in water when some salt is also dissolved therein may be greater or less than in water alone, varying with the salt and its concentration. A table of lactose solubilities for various concentrations of 24 salts is given, which should interest those working on whey and milk sugar. With calcium chloride, bromide, and iodide, lactose forms compounds which can be crystallized.

Digest from "Equilibrium Solutions of Certain Lactose-salt Mixtures," by Jensen, Hanford and Supplee, *Journal of Dairy Science* **23**, 745, 1940.

Creamery Fat Losses

SOME STATES, Iowa for example, set a maximum overrun in the manufacture of butter. Butter makers failing to get within a small fraction of the maximum are criticized. Just where the loss in overrun occurs can be calculated from a few weights (cream used, butter produced) and from tests (fat in cream, buttermilk and butter). Due allowance must be made for water added in cream rinsings and in the neutralizer. The losses can be calculated separately as (1) fat in buttermilk, (2) fat in excess of the legal 80 percent minimum in butter, (3) fat in overweight packages, (4) miscellaneous.

Digest from "Method for Determining Losses of Butter Fat in the Creamery," by M. Mortensen, *Journal of Dairy Science* **23**, 1073, 1940.

FATS & OILS

Egg Yolk Oil

ACCORDING TO Japanese Patent 129,144 (granted to Susumu Takaoka and Kenzo Isimoto, Kyoto, Japan, on an application filed March 13, 1939) egg yolk oil is readily obtained from eggs by a simple and convenient treatment. Yolks are separated from the whites and coagulated with ethyl alcohol. The coagulum is separated from the alcohol and pressed to recover the oil. Egg yolk oil is characterized by good emulsification behavior and its stable emulsions in water have a variety of uses. As an example, the oil is emulsified in an aqueous suspension of bentonite with the aid of a surface-active compound such as the sodium salt of sulphonated cetyl alcohol. The product is useful in cosmetic creams.

Fatty Acids in Cottonseed Oil

THE SATURATED FATTY ACIDS in thoroughly hydrogenated cottonseed oil have

"IDEAL" Bucket-Type ELEVATORS

When processing dry, powdered or granular food products, gravity flow of materials from machine to machine is usually most desirable. However, where gravity flow is not possible, a good, trouble-free, bucket-type elevator becomes a very profitable, time- and money-saving unit.

These sturdy elevators may be furnished with pulley for belt drive or, as illustrated, complete with motor. For complete information, specify the material to be elevated, capacity per hour and height required.

Get recommendations and prices—now. The cost of a good elevator is soon repaid many times over through production economies.

CATALOGS ON REQUEST

B. F. Gump Co

Established 1872

454 So. Clinton St. Chicago, Ill.

Fuller **STEELGRIPT BRUSHES**

TO manufacturers and processors of Food: Wherever you use Brushes, consider Fuller STEELGRIPT'S enduring construction with its greater density of brush material, securely gripped in rigid, rust resisting metal backings.

Conveying equipment, wrapping and packaging, bottling and labeling machinery operate more efficiently with these sturdy, long wearing Brushes.

Also try our standard line of Floor Brushes, Dusters and the famous FULLER FIBER Broom.

The FULLER BRUSH Company
INDUSTRIAL DIVISION — DEPT. 8C
3592 MAIN STREET HARTFORD, CONN.

previously been estimated to be, approximately: Myristic acid 0.3 to 0.6, palmitic acid 20 to 22, stearic acid 74 to 82 and archidic acid 0.1 to 0.6 percent. For exact information on this point, refined cottonseed oil was hydrogenated in presence of 2 percent of a nickel catalyst, under a pressure of 25 atmospheres. The melting point of the resulting fat was 61.5 to 62.2 deg. C. and the acid number was 2.4 with saponification number 189.9. This fat was hydrolyzed and the mixed fatty acids thus obtained were fractionally distilled in vacuum (2 mm.) in a slow current of carbon dioxide. Each fraction was colorless and odorless but the residue, amounting to about 5 percent, was brown and had a slightly sharp odor. Agreement of the analytical results with the previous estimate of fatty acid content was fairly good: Palmitic acid 24.5, stearic acid 69.5, arachidic acid 0.6 percent. Thus the predominance of stearic and palmitic acids is clearly established on an accurate quantitative basis.

Digest from "Fractional Distillation of the Fatty Acids of Thoroughly Hydrogenated Cottonseed Oil," by S. Ueno and T. Yoshikazi, *Journal of the Society of Chemical Industry, Japan* 43, 336B, 1940 (Published in Japan).

. . . ask any cook!

Company's comin' . . . the store's closed . . . and there's only half a loaf of bread in the house! That's a terrible predicament for any housewife to be in. But it's not half as bad as to have a whole, big $100,000 installation of new equipment in your plant STOPPED . . . because of the lack of just one little $1.90 stainless steel fitting! For *that's* what cuts into your net profits in a HURRY!

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MEATS & FISH

Drip Control In Frozen Fish

DRIP, or exudation of liquid, is familiar in certain frozen fish when defrosted but is not so well understood in unfrozen fish stored at temperatures just above 32 deg. F. Weight loss by drip is about 10 percent in fresh halibut fillets stored at 32 to 35 deg. F. and may reach 15 percent in certain commercially important varieties of Pacific flounder. Aside from the weight loss the exuded liquid impairs the quality of the fish and accelerates bacterial spoilage.

Experiments in controlling drip have shown that dipping in cold brine alters the flesh proteins (globulins) at the surface, sealing the fish in a thin transparent layer of peptized protein which serves to prevent drip. No general dipping conditions applicable to every commercial condition of fish storage can be prescribed, but dipping for one minute in brine containing 15 percent salt by weight (60 deg. Sal.) at 32 to 35 deg. F. will normally prevent drip in most fillets without causing them to absorb more than 1 to 1.5 percent of salt. Impure salt impairs flavor and should be avoided.

Digest from "Drip in Unfrozen Fillets Controlled by Brining," by H. L. A. Tarr and P. A. Sutherland, *Progress Reports of Pacific Biological Station and Pacific Fisheries Experimental Station*, No. 45, p. 19, 1940 (Published in British Columbia).

SUGAR

Quicker Reactivation Of Bone Char

BONE CHAR which can be reactivated by heat in about 15 minutes spends on an average about 270 minutes passing through a typical reactivation furnace in a sugar refinery. The spent char takes 4 minutes from base-plate to retort, 10 on its way through the heater, 130 through the retorts and 130 through the cooler. Since actual heating time at the reactivation temperature (800 to 900 deg. F.) need not be long, rapid temperature rise and rapid cooling are essential to faster operation.

Tests in an experimental furnace showed that the optimum reactivation temperature is about 850 to 900 deg. F. and that the maximum safe temperature is about 1,000 deg. F, since overburning becomes serious at higher temperatures. Through various changes in furnace design to improve heat transfer rates the reacti-

vation process was accelerated somewhat (about 90 minutes to bring all the char to reactivation temperature, 15 to reactivate and 90 to cool the char). One of the most effective changes was the use of thin-walled chrome-steel retorts. There is still much room for improvement, since most of the time the char is in the retort is spent in bringing the entire mass to equilibrium temperature.

Digest from "Bone Char Reactivation: Heat Transfer and Temperature Changes," by J. M. Brown and W. A. Bemis, *Industrial and Engineering Chemistry* 32, 1112, 1940. (From the Research Laboratory, Revere Sugar Refinery.)

VITAMINS

Vitamin B_1 In Foods

VITAMIN B_1 potency has been determined in a large number of foods by biological assay (rat growth method) in the Foods and Nutrition Laboratory, U.S. Department of Agriculture. The foods included 16 fruits, 23 vegetables, 7 legumes, 14 cereal products, 14 meat, fish and egg products and 7 dairy products. Ratings are based on potency in international units (I.U.) in the uncooked materials: *Excellent*, 150 I.U. or more per 100 grams; *good*, 100 to 150 I.U.; *fair*, 30 to 100 I.U.; and *poor*, less than 30 I.U. The rat growth method of vitamin assay is considered accurate within 15 to 20 percent. The ratings are arbitrary, making no allowance for quantity of food consumed. Thus a fair source like potatoes may contribute more vitamin B_1 to the body than an excellent source such as peanut germ which is less freely eaten. The assigned ratings are:

Excellent

Beans, lima, dried
Cowpeas, dried
Oatmeal, "quick cooking"
Oats, rolled
Peanut germ
Peanut skins
Peanuts, whole, raw
Pork chop (lean portion)
Pork, ham, smoked (lean portion)
Soybeans, fresh, green and dried

Good

Beans, lima, green
Beans, navy, dried
Cornmeal, white
Egg yolk
Milk powder, skim
Milk powder, whole
Peas, green
Rye, whole
Walnuts, Persian (English)
Wheat, whole

Fair

Asparagus
Beef, lean muscle
Broccoli
Brussels sprouts
Cauliflower
Chicken, dark meat
Cornmeal, yellow
Corn, sweet
Kale
Lamb, lean muscle
Liver
Mustard greens
Okra
Peanuts, roasted
Pineapple
Potatoes
Prunes, dried
Spinach
Sweet potatoes
Turnip greens
Wheat, shredded

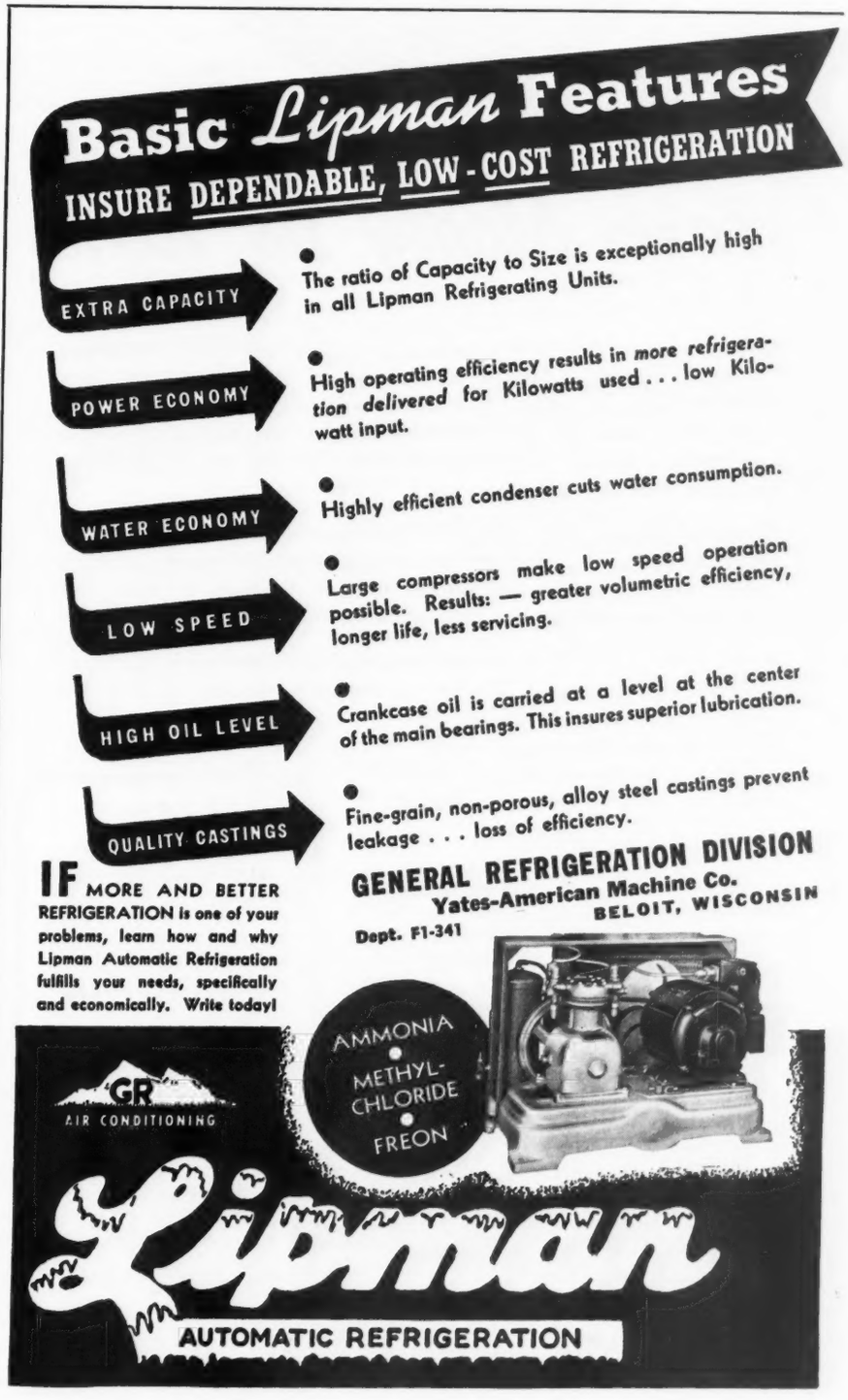
Poor

Apples
Bananas
Beans, green, snap
Beans, yellow wax
Beets
Blackberries
Cabbage
Carrots
Celery
Cheese
Chicken, white meat
Cocoa
Corn flakes
Egg white
Fish, halibut
Fish, salmon, red, canned
Fish, trout, fresh-water
Flour, wheat "straight milled"
Flour, patent
Grapefruit
Lettuce, head
Milk, condensed
Milk, evaporated
Milk, skim
Milk, whole
Molasses
Muskmelon
Onions
Oranges
Peaches
Pears
Plums
Raspberries, black
Raspberries, red
Rhubarb
Rutabagas
Sauerkraut
Squash
Strawberries
Tomatoes, red
Turnips

Digest from "Vitamin B_1 Content of Foods in Terms of Crystalline Thiamin," by Lela E. Booher and Eva R. Hartzler, *Technical Bulletin No.* 707, U. S. Department of Agriculture; printed by the Superintendent of Documents, Washington, D. C., price 5 cents.

Soy Bean Lecithin to Protect Vitamins in Baking

ENRICHMENT OF BREAD in vitamins A and D is hindered, not by any lack of sources, but by the thermal instability of vitamins A and D. To overcome this problem the vitamins must be stabilized so that they will not be destroyed when the bread is baked. According to Norwegian Patent 62,293 (granted April 8, 1940 to Arne Thormodsen of Oslo), a small proportion of soy-bean lecithin,


Basic Lipman Features
INSURE DEPENDABLE, LOW-COST REFRIGERATION
EXTRA CAPACITY
The ratio of Capacity to Size is exceptionally high in all Lipman Refrigerating Units.
POWER ECONOMY
High operating efficiency results in more refrigeration delivered for Kilowatts used . . . low Kilowatt input.
WATER ECONOMY
Highly efficient condenser cuts water consumption.
LOW SPEED
Large compressors make low speed operation possible. Results: — greater volumetric efficiency, longer life, less servicing.
HIGH OIL LEVEL
Crankcase oil is carried at a level at the center of the main bearings. This insures superior lubrication.
QUALITY CASTINGS
Fine-grain, non-porous, alloy steel castings prevent leakage . . . loss of efficiency.
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THERE are sound reasons ... actual facts ... to back up the statement that tested Oakite cleaning can save money for you. First, you have the experience of canners and packers of fruits, vegetables, soups, meats, fish ... food plants of every description now using dependable Oakite cleaning and germicidal materials. Here are just two of many examples that illustrate this:

Cleaning stainless steel cookers in one Eastern plant formerly was a two-hour job of scraping and scrubbing. Now ... simply by soaking cookers with recommended Oakite solution, followed by rinse and light brushing, equipment is cleaned in 45 minutes!

A Mid-western fruit juice canner's problem was cleaning kettles used for cooking prune juice. The job usually took two men an hour. But since an Oakite material has been used, considerably less scrubbing is needed ... kettles are now cleaned in HALF the time previously required!

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Have you a cleaning problem you want performed better, faster? Then put tested Oakite cleaning to work ... see with your own eyes the improved results it gives you, and how it saves you money. Write today ... no obligation.

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or even of soybean oil, serves to protect these vitamins from decomposition in the oven. The preferred recipe for bread enriched in vitamins A and D, according to this invention, is: Wheat flour 0.5, cracked wheat 1.2, barley flour 0.5, yeast 0.025 parts. This batch is enriched by adding to the dough 0.225 part codliver oil, 0.06 part soybean oil, 0.002 part soybean lecithin and 0.025 part sirup. The added vitamin potency is retained in the baked product.

MISCELLANEOUS

Overrated Antiseptic Power Of Onions

THE OLD popular belief that onions and garlic have germicidal powers has some foundation in fact. Tests were made with sound, unsprouted yellow Globe onions and with white Texas onions. Roots and dried outer scales were discarded and juice was obtained by pulping the onions in a sterilized grinder and extracting the juice in a sterilized screw press. Freshly cut slices from both types of onion had some germicidal power, which was apparently lost in the expressed juice. This indicates the presence of a volatile germicide which is lost during grinding and pressing. The juice itself was not sterile, in spite of the aseptic conditions of preparation. Juice was therefore sterilized in a Seitz filter and used in concentrations of 1, 5, 10, 20, 30, 40, 50, 60, 80 and 100 percent to inhibit the growth of several common contaminating organisms from air and several from human sources.

Not even pure onion juice was able to inhibit growth of *Aerobacter aerogenes* (one of the air contaminants). On the other hand, as little as 1 percent weakened the growth of *Staphylococcus aureus*, one of the contaminants from human sources. Some of the organisms were actually killed, but usually they remained alive and merely stopped growing. Some of the organisms which cause food poisoning were included in the tests and their growth was stopped by 10 to 40 percent solutions of onion juice.

Thus it appears that onion juice contains a volatile germicidal substance which is quickly lost when the juice is exposed to air, but that the juice itself possesses some power to inhibit growth in bacteria and even to kill some of the sensitive organisms. This power is weakened or destroyed by heat but was retained after four months of storage.

Digest from "Onion Juice and Bacterial Growth," by J. E. Fuller and E. R. Higgins, *Food Research* **5**, 503, 1940.

Books

Air Conditioning, Heating

MODERN AIR CONDITIONING, HEATING AND VENTILATING. By Willis H. Carrier, Realto E. Cherne and Walter A. Grant. Published by Pitman Publishing Corp., 2 West 45th St., New York, N. Y. 1940. 547 pages; 6½x9¼ in.; cloth. Price, $4.50.

Here is one of those books which occasionally come along that ought to be on the shelf of every engineer and plant operating man in the food industries. It is written to bridge the gap between theory and practice, and it is so designed that men with limited technical training may understand the basic principles and practices of the art.

A considerable quantity of data is published for the first time, this being data developed by the Carrier Corp.

The 20 chapters in the book are devoted to psychrometrics and comfort, estimating requirements, economics, heat producing and distributing equipment, steam and hot water heating systems, controls and zoning for heating, fans, heaters and ventilators, air cleaners and humidifiers, design of air duct systems, cooling and dehumidification, central and unit systems, refrigeration for air conditioning, air distribution and zoning, automatic controls for air conditioning, application practice, noise and vibration.

Dairy Industries Manual

MANUAL FOR DAIRY MANUFACTURING SHORT COURSES. By the Dairy Manufacturing Division of Pennsylvania State College. Published by Edwards Brothers, Inc., Ann Arbor, Mich. 1940. 266 pages; 10¾x8¼ in.; paper. Price, $3.

While written for use in dairy short courses, this manual has possible use as a handbook by dairy plant operators and technologists. The information is terse, but none the less useful. Complete processes and operations are covered in a few lines, but the fundamental factors entering into the process are there. The manual is in three parts. Course I pertains to the testing of dairy products and the manufacture of butter and cheese; Course II, ice cream making; Course III, market milk and milk control.

Spotlighting a Racket

FOOD,TEETH, AND LARCENY. By Charles A. Levinson. Published by Greenberg, 67 West 44 St., New York, N. Y. 1940. 232 pages; 5½x8½ in.; cloth. Price, $3.

Personal-injury suits, which annually cost food manufacturers a good many thousands of dollars, are here examined and highlighted by an authority on the "foreign substance racket." Dealing directly with fraudulent claims and products liability insurance, this survey presents a scientific method of crime detection valuable to food company executives.

With the aid of case histories, charts and diagrams, the book covers the important points of the foreign substance racket. Particularly helpful to food manufacturers are the comprehensive discussions of dishonest and honest claims, proper method of fighting the claims, court procedure and the relationship of the examining dentist or physician to his company.

What Consumers Think

MAKING CONSUMER EDUCATION EFFECTIVE. (Proceedings of 2nd National Conference on Consumer Education.) Published by Institute of Consumer Education, Stephens College, Mo. 253 pages; 6x9 in.; paper. Price, $1.

Manufacturers will find the 1940 Consumer Education Conference report something of a guide to the present opinions and attitudes of consumer groups. Although the report is slanted to analyze a scientific method of critical thinking for consumers, certain chapters on propaganda, the psychology of advertising and public relations are of practical value to the processor.

The relationship between processor and consumer is discussed from the viewpoint of labor, better business bureaus and cooperatives, with attention given to problems of milk supply and government grading of merchandise.

Vitamin Technology

WHAT ARE THE VITAMINS? By Walter H. Eddy. Published by Reinhold Publishing Corp., 330 West 42nd St., New York, N. Y. 1941. 247 pages; 6½x9¼ in.; cloth. Price, $2.50.

This book comes along at a most appropriate time, its publication being synchronized with the big rush to fortify foods, especially bread, with vitamins. Though it does not answer the production and product control problems of the food manufacturers who add vitamins to their products, it does "tell all" about the vitamins themselves.

The author answers these questions: What are the vitamins? What do the vitamins do? He explains the properties of vitamins A and B_1 and the functions of riboflavin (B_2 or G), nicotinic acid (vitamin P-P), vitamin B_6 and other members of the B-complex, and vitamins C, P, D, E and K. The chemical nature of vitamins is discussed and a table of vitamin values given.

The Saga of Sugar

SOME NOTES ON SUGAR AND MOLASSES. By Charles W. Taussig. Published by Applied Sugar Laboratories, Inc., 120 Wall St., New York, N. Y. 1940. 234 pages; 4x6¼ in.; imitation leather. Price, $3.

In this little book is traced the development of the American sugar industry. The author is a man whose heritage in the industry goes back to a grandfather whose molasses and pies were enjoyed by President Abraham Lincoln. Woven into the story are the policies and practices of a progressive industrial organization. And in it are described the processes of refining sugar and molasses, even to a flow sheet.

We go even further than the publisher and recommend this book as inspiring and educational reading for anyone with a deep interest in the food processing business.

Letter to the Editor

To the Editor of FOOD INDUSTRIES:

Got a kick out of your "Talk of the Industry" item concerning fish and the Department of Agriculture.

Your writer interestingly displayed a bit of bewilderment as to agriculture taking over some fish items and ignoring other fish "farming." In which bewilderment we concur—and further.

We never could understand how Agriculture gets out consumer guide publications concerning food and yet ignores fish as food. The great American public thinks of Agriculture as the food department of the government and its opinion is backed up by the work Agriculture is doing.

We may be wrong, but we have always looked upon fish and shellfish as a food—and a darn good, substantial one. Or else why are thousands of commercial fishermen braving dangers (such as the recent drowning of 18 men outside Boston harbor) and dealers investing millions of dollars in the fisheries? Don't you think it is only fair to let them know they are not producing a food? Some of those fishing vessels run up to $50,000 or more. You could buy a pretty good sized farm with that money.

Maybe we better just go along selling our fish as a food to the public which knows it is one of the better low-priced, tastiest and healthful foods it can buy.

Yours for bigger and better items like the one we refer to.—A. E. KESSLER, *Executive Secretary, Fishery Council.*

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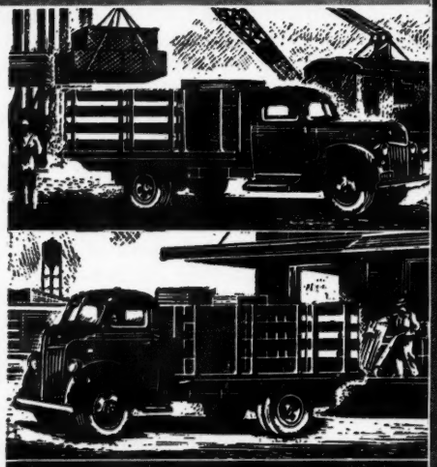

FORD TRUCKS

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Patents

Chocolate Molds Coming From Cooling Machine Emptied by Mechanical Means—Max Heidelmeyer, Niederseditz, Germany. No. 2,222,745. Nov. 26, 1940.

Thoroughly Dried Starch Made Water Resistant by Being Mixed With Formaldehyde and an Acid—Gerald J. Leuck, Evanston, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,222,872. Nov. 26, 1940.

Starch Made Water-insoluble by Treatment With an Alkali Preparatory to Mixing With Formaldehyde and an Acid—Gerald J. Leuck, Evanston, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,222,873. Nov. 26, 1940.

Starch Freed From Absorbed Water and Combined Water as Starch Hydrate Preparatory to Mixing With Formaldehyde to Form a Water-insoluble Plastic—Gerald John Leuck, Evanston, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,222,874. Nov. 26, 1940.

Starch Treated With Alkali Without Becoming Gelatinized, Containing no Amylose Decomposition Products, Having Higher Fluidity Than Raw Starch, and Given a Cold-water Solubility Not Substantially Above That of Raw Starch Preparatory to Mixing With Formaldehyde to Form a Water-resistant Product—Gerald John Leuck, Evanston, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,222,875. Nov. 26, 1940.

Animal and Vegetable Fats and Oils Stabilized Against Oxidative Deterioration by Chemical Treatment—Erich Böhn and Theodor Sabalitschka, Berlin, Germany. No. 2,223,244. Nov. 26, 1940.

Bread Doughs Given Increased Moisture Absorptive Power by Inclusion of a Blend of 20 to 30 Percent of Roller Milk Powder and 70 to 80 Percent of Spray Milk Powder—Raymond Powers, Syracuse, N. Y., to The Borden Co., New York, N. Y. No. 2,223,269. Nov. 26, 1940.

Evaporated Milk Stabilized Against Separation by the Addition of Small Percentage of an Edible Alginate While Milk is Being Evaporated to Desired Consistency—Vernon K. Wilt, to Kelco Co., Los Angeles, Calif. No. 2,223,277.

Macaroni Products Made on Press Designed to Produce in a Linear Row a Given Number and Length of Strings of Paste—Joseph De Francisci, Brooklyn, N. Y. No. 2,223,351. Dec. 3, 1940.

Dough Strings Extruded in Linear Row Automatically Looped Upon a Rack Rod—Joseph De Francisci, Brooklyn, N. Y. No. 2,223,352. Dec. 3, 1940.

Cereals and Grain Products Given Increased Resistance to Mold Growth and Fixed in Yellow Color of Natural Grain by Treatment With Nitric Acid or Oxides of Nitrogen at About 80 to 100 Deg. C. for About 5 Min.—Oreste Scalise, New York, N. Y. No. 2,223,387. Dec. 3, 1940.

Lipoidal Substances Separated From Fungus Growths for Extraction of Sterols—William Gordon Bennett, Epsom, England, to Standard Brands, Inc., New York, N. Y. No. 2,223,398. Dec. 3, 1940.

Beer Wort Fermented in the Presence of Malt Diastase to Produce a Low-sugar Beverage—Hans Distler, Cologne-Lindenthal, Germany, to Paul Josef Winter, Cologne-Lindenthal, Germany. No. 2,223,444. Dec. 3, 1940.

Yeast Stabilized by Addition of a Fatty Acid Partial Ester of a Polyhydric Alcohol—Alfred S. Schultz, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,223,464. Dec. 3, 1940.

Yeast Stabilized by the Addition of Glycerol Monolaurate—Alfred S. Schultz, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,223,465. Dec. 3, 1940.

Frozen Meats Slit Into Sliced Portions by Mechanical Means—Joseph P. Spang, Quincy, Mass., to Cube Steak Machine Co., Inc., Boston, Mass. Nos. 2,223,466 and 2,223,467. Dec. 3, 1940.

Yeast Solution Subjected to CO_2 Treatment Under Less Than Atmospheric Temperatures at Above Atmospheric Pressures, Preliminary to Subsequent Treatment at High Pressures and Higher Than Atmospheric Temperatures up to Approximately 49 Deg. C., After Which Pressure is Released and Mixture Run Into Vacuum for Separation of Gas From the Solution—William P. Torrington, New York, N. Y., to Emulsions Process Corp. No. 2,223,501. Dec. 3, 1940.

Worts of Not Less Than 70 Percent Total Extractive Content Prepared From Mashes to Which Small Amounts of Peroxycompounds Have Been Added Prior to and Following the Enzymic Digestion of the Grain—John P. Ioannu, Philadelphia, Pa. No. 2,223,520. Dec. 3, 1940.

Food Materials Diced on a Commercial Scale by Mechanical Means—Michael F. Bauer, Chicago, Ill., to American Utensil Co. No. 2,223,542. Dec. 3, 1940.

Emulsions Prepared by the Use of a Mixture of Esterified Glycerol and Polyglycerol—Albert K. Epstein, Chicago, Ill. No. 2,223,558. Dec. 3, 1940.

Sugar Crystals in Centrifugal Basket Washed Free From Sirup by 160 to 200 deg. F. Water Under 20 to 70 lb. Pressure Per Square Inch Comingled With Saturated Steam Under Similar Pressure to Form a Hot Mist of Superheated Water and Steam—Eugene Roberts, Hastings, N. Y., and George E. Stevens, Denver, Colo., to The Western States Machine Co., New York, N. Y. No. 2,223,663. Dec. 3, 1940.

Egg Noodles Made From Paste Resulting From Mixing the Egg Content With One-half of the Total of Water Required to Form a Colloidal Strand-free Mixture Preparatory to the Addition of Grits and the Rest of the Water to Give the Paste the Desired Consistency—Charles Hummel, Niederuzwil, Switzerland, to Gebrüder Bühler, Uzwil, Switzerland. No. 2,223,687. Dec. 3, 1940.

Shortening Made and Packaged in an Atmosphere of Nitrogen to Prevent Absorption of Objectionable Odors and to Retard Oxidative Deterioration—Truman M. Godfrey, Winchester, Mass., and Victor Serbell, Leonia, N. J., to Lever Brothers Co. No. 2,223,724. Dec. 3, 1940.

Juices Extracted From Fruit by Mechanical Means—Robert J. Newton, Honolulu, Territory of Hawaii, to California Packing Corp., San Francisco, Calif. No. 2,223,739. Dec. 3, 1940.

Beer and Ale Worts Treated With a Tannase During Fermentation for the Breaking Down of Tannin Compounds—James S. Wallerstein, to Wallerstein Co., Inc., New York, N. Y. No. 2,223,753. Dec. 3, 1940.

Spray-dried Free-flowing Sugar Mixture Made From Starch-conversion Sirup and Sucrose Containing Not More Than 2 Percent of Sucrose Inversion—James F. Walsh, Tuckahoe, N. Y., to American Maize-Products Co. No. 2,223,925. Dec. 3, 1940.

Foods Frozen While Passing Through Refrigerating Medium on Series of Pans Attached to a Continuous Conveyor—Henry W. Sterling, Salisbury, Md. No. 2,223,972. Dec. 3, 1940.

Fruit Juices Concentrated to Have at Least 14 Percent by Weight of Fermentable Sugar Preliminary to Alcoholic Fermentation and Subsequent Acetic Fermentation for Production of Fruit Vinegar—Hans Mostny, Godoy Cruz, F. C. P. Mondóza, Argentina. No. 2,224,059. Dec. 3, 1940.

Gelatine Dessert Product Improved in Flavor by Adding Levulose, Glucose, Maltose, Invert Sugar, Glycerol or an Edible Glycol to Gelatin Solution With Other Ingredients, Adjusting to About 3.5 to 4.7 pH and Gelatinizing Preparatory to Drying and Granulating Into a Relatively Stable, Free-Flowing and Non-Hygroscopic State—William E. Stokes, Brooklyn, and Margaret H. Kennedy, New York, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,224,167. Dec. 10, 1940.

Base-forming Element Content of Any Natural Food or Food Product Increased by the Addition of Organic Salts in Quantities to Give Ratio of 30 to 185 Parts of Potassium Present to Each 100 Parts of Sodium—Edward C. Callaway, Corvallis, Ore. No. 2,224,252. Dec. 10, 1940.

Wine Quickly Aged by Storing in Contact With Oak Wood Containing Vegetable Hormone Activated Fungi Spore Growths—Ernst T. Krebs and Ernst T. Krebs, Jr., San Francisco, Calif. No. 2,224,352. Dec. 10, 1940.

Lean Beef Particles Pickled, Compressed Into Desired Form and Cooked to Coagulate Protein and Bind Pieces Together Preliminary to Smoking and Drying Into Integrated Mass of Dried Beef—Stephan L. Komarik to Griffith Labs., Inc., Chicago, Ill. No. 2,224,397. Dec. 10, 1940.

Whole Meat Canned by Mechanical Forcing Into Container, Sealed Under Vacuum and Then Cooked—Stephan L. Komarik, to Griffith Labs., Inc., Chicago, Ill. No. 2,224,398. Dec. 10, 1940.

Raw Ham Cooked Under Controlled Conditions in Sealed Can—Stephan L. Komarik, to Griffith Labs., Inc., Chicago, Ill. No. 2,224,399. Dec. 10, 1940.

Candy Canes Made by Mechanical Means—Ray W. Krout, Paterson, N. J., to Charms Co., Bloomfield, N. J. No. 2,224,400. Dec. 10, 1940.

Hot Chewing Gum Mass Pressed Into Individual Sticks in Machine Designed to Keep Gum From Sticking to the Pressing Surfaces and to Remove Moisture From Air in Contact With Cooled Pressing Surfaces—Frank A. Garbutt, Los Angeles, Calif. No. 2,224,430. Dec. 10, 1940.

Chewing Gum Flavored by Addition of Cocoa Powder Containing Not More Than 10 Percent Fat—Louis William Mahle, Melrose Park, Pa., to Frank H. Fleer Corp., Philadelphia, Pa. No. 2,224,637. Dec. 10, 1940.

Cheese-like Product Made by Heating a Thin Pasty Mix of Milk Solids and Water Coagulated by an Acid to Above 150 Deg. F.—Theron H. Butterworth, Syracuse, N. Y., and William A. Sommer, Fond du Lac, Wis., to Borden & Co., New York, N. Y. No. 2,224,720. Dec. 10, 1940.

Meat and Similarly Solid Material Mechanically Forced Into Cans of Various Heights But of Same Cross Section Area—Carroll L. Griffith, to Griffith Labs., Inc., Chicago, Ill. No. 2,224,908. Dec. 17, 1940.

Ground Coffee Particles Impregnated and Coated With Coffee Extract to Make a Prepared Coffee Concentrate—Maurice Weisman, Roxbury, Mass. No. 2,224,942. Dec. 17, 1940.

Milk and Cream Treated With Small Amounts of Pancreatic Enzyme Material to Prevent Development of Cardboardy, Oxidized or Hay-like Odors and Flavors—Victor Conquest, Chicago, and Willard Turner, Elgin, Ill., to Armour & Co., Chicago, Ill. No. 2,225,553. Dec. 17, 1940.

Yeast Preparation Made From 400 Parts Fresh Bakers' Yeast, About 200 Parts of Red-current Concentrate and 500 Parts of Cane Sugar—Charles Weizmann, London, England. No. 2,225,576. Dec. 17, 1940.

Liquid and Semi-liquid Foods Preserved Against Deterioration by Subjecting to Moderate Vacuum Above Freezing For 15 Min. to De-gas and Then Subjected to High Vacuum For Removal of Water Vapor and to Freeze—Earl W. Flosdorf, Ardmore, Pa., to F. J. Stokes Machine Co., Philadelphia, Pa. No. 2,225,627. Dec. 24, 1940.

Sausages and the Like Packaged in Transparent Casings Identified by Printed Strip of Paper Inserted Into Casing Along With and Forced Against the Inner Surface of Casing by the Sausage—Alpheus J. Freeman, to Freeman, Inc., Chicago, Ill. No. 2,225,694. Dec. 24, 1940.

Sausages Inoculated With Lactobacilli to Control Flavor Development, to Prevent Growth of Undesired Microorganisms and to Improve Curing Procedure—Lloyd B. Jensen and Levi S. Paddock, Chicago, Ill. No. 2,225,783. Dec. 24, 1940.

Sugar Composition Made to Have Free Flowing, Non-hygroscopic, and Grease-resisting Properties for Dusting Doughnuts—John R. White, Belmont and Joseph Avery Dunn,

Newtonville, Mass., to Lever Bros. Co. No. 2,225,894. Dec. 24, 1940.

Fish Cut Into Desired Lengths and Subjected to Predetermined Compression by Mechanical Means Preparatory to Canning—Walter E. Rooney, Bellingham, Wash., to American Can Co., New York, N. Y. No. 2,226,019. Dec. 24, 1940.

Tomatoes and the Like Ripened Under Controlled Conditions While Contained in a Shipping Car—Frank J. Reilly and Maurice H. Connell, Miami, Fla., to General American Precooling Corp., Chicago, Ill. No. 2,226,480. Dec. 24, 1940.

Fruit Juices Extracted in Chamber Filled With Inert Gas and Closed With a Liquid Seal—Ronald B. McKinnis, Highlands City, Fla., to Sunshine Foods Inc., Winter Haven, Fla. No. 2,226,513. Dec. 24, 1940.

Starch-molded Confectionery Made in an Automatic Manner—Alonzo Linton Bausman to National Equipment Co., Springfield, Mass. No. 2,226,890. Dec. 31, 1940.

Bread and Cake Flour Given Coffee Color and Flavor by Addition of Finely Ground Solvent-extracted Raw Coffee Beans—Robert Brown, New York, N. Y. No. 2,227,063. Dec. 31, 1940.

Carbonated Beverage Mix Made by Deaerating Cool Water, Blending With Cool Flavoring Sirup, and Carbonating Prior to Bottling—George L. N. Meyer, Milwaukee, Wis. No. 2,227,101. Dec. 31, 1940.

Tenderness of Peas Determined Mechanically by Measuring Force of Resistance of the Peas to Shearing-action Pressure—William McKinley Martin, Maywood, Ill., to Canning Industry Research, Inc., Washington, D. C. No. 2,227,226. Dec. 31, 1940.

Frozen Confections Packaged in Thin Flexible Chlorinated Rubber Bag Closed at Both Ends and Reinforced by Paper Strip Extending Lengthwise of Bag—Clarence W. Vogt, Norwalk, Conn., to Owens-Illinois Glass Co., Toledo, Ohio. No. 2,227,236. Dec. 31, 1940.

Carrot Meal Made From Untreated Raw Carrots—Clarence M. Nesbitt, Oneonta, N. Y., and David E. Warner, Storrs, Conn., to Carromeal, Inc., West Brookfield, Mass. No. 2,227,317. Dec. 31, 1940.

Margarine Given Improved Properties by Chemical Compound Having Balanced Lipophile and Hydrophile Groups and a Hydrophyllic Lipin—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. Reissue No. 21,683 Jan. 7, 1941.

Ice Cream Cones Given Sanitary Shield for Holding During Eating—Walter E. Amberg, Arthur S. Bowes and Stephen W. Amberg, to Universal Paper Products Co., Chicago, Ill. No. 2,227,428. Jan. 7, 1941.

Ravioli Made by Mechanical Means—Louis G. Lombi, West Englewood, N. J. No. 2,227,728. Jan. 7, 1941.

Dried Ham Prepared by Pressing De-boned Meat Into Compact Mass and Drying Under Pressure—Elmer C. Oswald and Reese Gardiner Lewis, to Armour & Co., Chicago, Ill. No. 2,227,738. Jan. 7, 1941.

Cheese of Blue-vein Type Ripened by Holding at Lower Than Normal Temperatures in an Atmosphere of Higher Than Normal Carbon Dioxide Gas Concentration—Norman S. Golding, Pullman, Wash., to State College of Washington Research Foundation, Pullman, Wash. No. 2,227,748. Jan. 7, 1941.

Candy Scrap Treated to Recover Sugar Content—Albert C. Roland to Applied Sugar Labs., Inc., New York, N. Y. No. 2,227,813. Jan. 7, 1941.

Canadian Patents

Eggs Packed in Collapsible Cartons Designed and Cut For Speedy Manual Assembly—Rudolf Sandell, Stockholm, Sweden. No. 393,184. Dec. 17, 1940.

Chewing Gum Wrapped in a Rectangular Casing Having a Sight Opening for Display and a Frictionally Sealed Flap Closure—Russell L. Harris, Port Washington, N. Y., to Canadian Chewing Gum Co., Ltd., Toronto, Ont. No. 393,209. Dec. 17, 1940.

Artificial Sausage Skins Produced by Extruding Paste of Swollen Animal Fiber Through Annular Nozzle—Oskar W. Becker and Emil Braun, to Naturin-Werk Becker & Co., Weinheim, Baden, Germany. No. 393,424. Dec. 24, 1940.

Refrigeration Controlled Through a Thermostatically Actuated Valve in Conduit Connecting Refrigerated Upper Chamber With Lower Chamber—Lester J. Brain, Sydney, New South Wales. No. 393,434. Dec. 31, 1940.

Evaporation of Volatile Components From Glass-packed Products Prevented by Screw-cap Closure With Greaseproof and Gas-impervious Laminated Lining—Jay B. Eisen, Yonkers, N. Y., to Ferdinand Gutmann & Co., New York, N. Y. No. 393,523. Dec. 31, 1940.

Eggs Packed in Containers Readily Assembled From Vertically and Horizontally Slotted Blanks—Edgar Villeneuve and Geo. D. Dussault, to J. C. Wilson, Ltd., Montreal, Quebec. No. 393,580. Dec. 31, 1940.

Vegetables Pealed by Water-driven Disk Carrying Peeler Blades—Howard A. Johnston, Toronto, Ont. No. 393,591. Dev. 31, 1940.

Milk Bottles Closed by Two-fly Apertured Cap With Externally Attached Lifting Tab to Close the Aperture—Roger Miller, North Battleford, Saskatchewan. No. 393,860. Jan. 14, 1941.

Flour Sifted Into Closed Receiver to Prevent Dusting—Genzo Nakahiro, San Francisco, Calif. No. 393,864. Jan. 14, 1941.

Food Chilled During Transit in Refrigerator Car Fitted With Pivoted Slats to be Opened or Closed for Control of Ventilation—Robert K. Schwebs, Hortonville, Wis. No. 393,870. Jan. 14, 1941.

Salad Dressing Emulsions Stabilized by Acetic Acid and Soybean Protein—Robert J. Gilmour, Montreal, to Continental Soya Co., Ltd., Outremont, Quebec. No. 393,927. Jan. 14, 1941.

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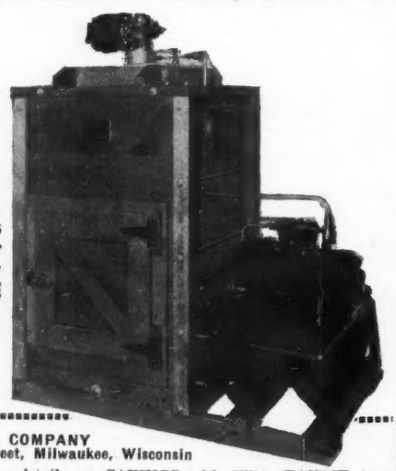

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Western Hemisphere Cheeses

(Continued from page 60)

imported, they tried the American-made cheese and so the Holland-type cheeses have been gradually replaced. As time goes on, the American-made products become more firmly established. Of course, raw materials and labor are both higher than they are in Holland, but this high manufacturing cost may be offset to a degree by quantity production and other methods. Replacing the Holland-type cheese with the American-made products was similar to the experience one of the American manufacturers encountered during the World War. At that time, Camembert cheese made in America sold only with fair success until shipments of French Camembert were cut off. The American public then found how good the American-made Camembert was, and France has never been able to recover the American markets as the American-made cheese is of the finest quality."

Mr. Hart of Kraft's says that with the cutting off of shipments from France, Italy, Denmark, the Netherlands and to some extent Switzerland, American manufacturers have had the needed incentive to manufacture domestic cheese of imported types and that, while heretofore their efforts have not always been very successful, they are now making considerable progress on many of their foreign types. They have been rather successful in imitating Holland-type Edam and Baby Gouda. No attempt has been made to imitate English Stilton, since only light quantities have ever been sold in this country. Brie cheese is now manufactured in this country.

Holland-type cheeses from South America are not very good, in the opinion of J. Sipkin, Holland Food Corp., nor does even that made in the United States compare with that made for 200 years in Holland, since we have not the same climate, fodder, breed of cattle, nor experienced cheese makers. But Mr. Weil of June Dairy says they make an almost identical Edam, some of it in a square loaf instead of round, but finished in red paraffine, and a Baby Gouda that the trade is accepting without hesitancy. Holland-type cheeses have been "offset" by Argentine imports coupled with our own American make.

Oka and the Scandinavian Cheeses

As for Oka (Trappist-type), J. C. Marquardt of the experiment station at Geneva says present methods do not assure a uniform product, and there are defects like gritty texture and bitter flavor to be eliminated, but they have worked out a "Geneva method" (the preparation of a Trappist blend) for making this type of cream cheese on a larger scale.

And what of the Scandinavian cheeses? The Norwegian cheese Gjetost is made by J. Holmboe & Co. in Campbell, N. Y., and is a good substitute, according to the importer, S. A. Haram of New York. Mr. Haram also handles a substitute for Nokkelost, but says the Danish Appetitost and Jadarost cannot be duplicated. Then small stocks of Sweden's famous Graddost (a cream cheese made of cow's milk) and Bondost are being supplied by Wisconsin, as well as by Uruguay and Argentina.

"Switzerland" Cheese

Switzerland seems to be able to get some of her cheeses through even now. (One ship is expected before date of publication). Imported "Switzerland" was 90 cents a pound retail at the date of writing. "It is high, because the cheese has ripened for three years," says the importer A. C. Dolder, of the Switzerland Cheese Association.

"We have very strict laws in Switzerland," he told us, "regarding the providing of fodder, the method of milking the cows, and the delivery of the milk. And we have cheese makers of long experience. It is no secret how Swiss cheese is

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made; we have a free interchange of experience with the agricultural experiment stations of the United States. But the skill of the cheese maker is all important. In Switzerland 75 to 80 percent of the cheese produced is first grade, but in the U.S. only 10 to 15 percent, as paid for at the factories, is first grade. We have a bonus system in Switzerland; the cheese maker *has* to produce a minimum of 75 percent of first grade, but if he produces more, he gets a bonus, and his bonus is increased in value as his percentage increases. And while the ordinary cheese maker gets just an ordinary price, the maker of a high percentage of first grade cheese gets much higher prices.

"The cheese sent to the U.S. is very carefully selected to be mild tasting and good looking, as that is what the American trade thinks the American public likes, though I myself differ as to that. Each country has its own specifications."

Mr. Weil says June Dairy makes a Swiss cheese at their Wisconsin plant, the fanciest grades of which they cure for seven or eight months and brand as super-cured. This is being favorably received, particularly as a recent import of genuine Swiss cost 65 cents wholesale, whereas domestic was only 42 cents.

Mr. Dolder said the stocks of Emmenthaler and Gruyere on hand would not last more than a few days if the demand were normal, but owing to high freight rates the cost is such that it is still available in stores where price is not of prime importance.

Sprinz is being made in Argentina at a comparatively low price, though Mr. Dolder and others say it does not compare in flavor to that first cheese ever made by the Swiss and so greatly relished by the old Roman soldiers. Argentina has also shipped some Swiss processed cheese, 80,000 lb. last October, according to Department of Commerce figures, besides 1,000,000 lb. of other cheeses (mostly Italian and Blue).

"While the South American cheeses are poor substitutes for the types we cannot get from Europe," says Mr. Holst-Knudsen, New York cheese agent, "the possibility of course exists that cheese makers in South America may succeed in improving the quality of their product. Two or three cheese factories in South America have already shown progress."

Mr. Rothenberg thinks it possible that Finland may recover soonest of the European countries and again send us her Gruyeres. He is not enthusiastic about our domestic Gruyeres. But, he says, with regard to one other domestic imitation of a European type cheese, that we have been making better Limburger for the past 25 years than Germany ever made. Our domestic "American" is of course a Cheddar-type, and our Brick is an American type, while our New York Muenster excellent.

The Serra cheese lately introduced by Casa de Portugal is a specialty of northern Portugal, and has a consistency between that of Brie and that of Pont-l'Eveque, while their Romano-type cheese made of sheep's milk is a staple of the southern province of Alentejo.

Confusion About Fortification

(Continued from page 57)

are made to define "natural" levels of nutrition in terms of the diet of previous generations. It should make little difference whether natural levels or some other standard is used in determining the nutritional optimum of any food to be attained by the addition of previously unused food factors. To many, the natural level has an appeal as a means of keeping fortification within certain definite bounds. Yet, if the nation's dietary is to be better served through the use of other standards, other specifications can eventually be written on that basis to provide adequate nutrition.

Leave Room for the Future

As long as biological chemists, nutritionists and others in the medical sciences are actively studying health and diet, as long as analytical procedures for the newer factors are undergoing improvements, and as long as new factors are being discovered, our ideas of optimum nutrition will be in need of constant revision. No industry should assume that the last facts are known about any phase of nutrition. Any fortification should be along conservative lines without overemphasis or rigid compulsion in order to better meet the changes the future will bring.

A close study of the needs, sources of fortifying materials and facilities for control are advisable before deciding to fortify. Any addition of food factors should be made because of an established need, not because of a real or fancied promotional advantage. In most cases, the permanent interest of each industry and of the nation as a whole may be best served by first permitting the development and standardization of analytical and control methods, followed by a widespread accumulation of reliable data. Then the program of providing better diet can proceed along scientific and rational lines.

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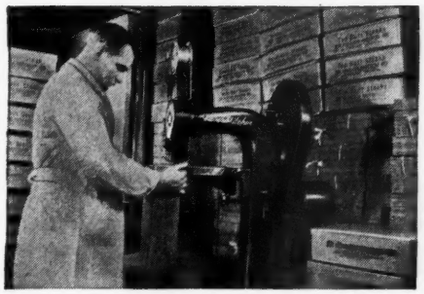

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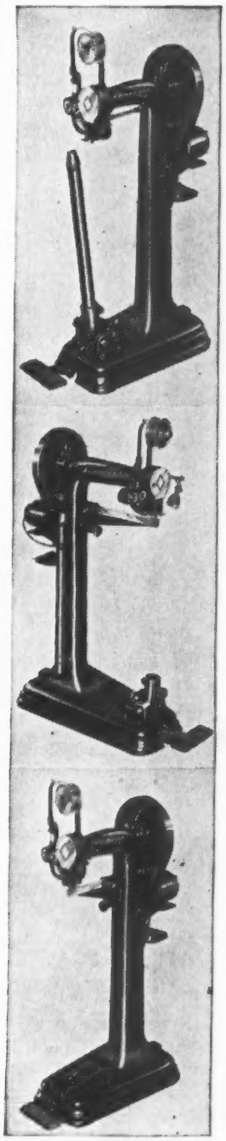

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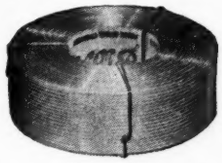

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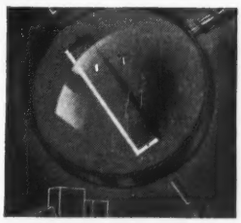

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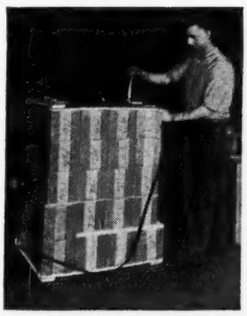

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Formulas for Foods

FORMULA NO. 164

Soybean Bread (15 Percent) Straight-Dough Method

Laboratory Formula

Flour (clear) wheat	265 gms.
Soybean flour	50 gms.
Water (variable)	200 ml.
Yeast	8 gms.
Malt extract, powdered	1 gm.
Arkady yeast food	0.75 gm.
Milk (powdered skim)	12.6 gm.
Shortening	9.5 gm.
Salt	6.3 gm.
Sugar (sucrose)	16.0 gm.

Working Directions

First punch at 1½ hours. Second punch ¾ hour later. To pan ¼ hour later. Fermentation temperature, about 86 deg. F. Reduce top heat in oven during latter part of baking period, otherwise the top crust will be very dark.

Yield when baked, about a 1-lb. loaf.

Formula from J. A. Le Clerc, Senior Chemist, Agricultural Chemical Research Division, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, Washington, D. C.

FORMULA NO. 165

Army Field Bread

	Percent	*Pounds*
Flour (straight)	100	100
Water	53–55	53–55
Yeast	¾ of 1	¾
Salt	2	2
Sugar	3	3
Shortening	½ of 1	½

Procedure

Mix ingredients thoroughly and endeavor to secure a mixed dough temperature of 78 to 80 deg. F. Dough should be ready for first punch in from 4 to 4½ hours, and fermentation completed 1 to 1½ hours later. Scale dough into 4½-lb. pieces. Round the dough and then flatten out into circular loaves about 10 in. in diameter and 1½ in. thick. Allow only approximately 15 minutes proof. Just before baking, dock the top surface of the dough in three places by inserting the thumb or stick into the dough for a depth of about 1 in.

Bake either in regulation bake pan (two loaves to pan) or in commercial cake pan (18x25 in.) (three to pan). Give long, slow bake for from 1½ to 1¾ hours with oven at temperature of 450 deg. F. The result is a circular loaf about 11 in. in diameter and 4 to 5 in. thick, with a thick, hard crust.

This hard crust, if unbroken, minimizes the probability of mold development, permits rough handling and stacking in transportation without injury, and will keep the bread fresh and palatable for a period of from two to four weeks.

Formula from the Quartermaster General, U. S. Army. Training Manual No. 2100–151.

FORMULA NO. 166

Orange Marmalade

Orange pulp in 10-lb. cans	5 cans
Sugar (sucrose)	70 lb.
Water	2 gal.

Put all ingredients in steam-jacketed kettle and boil to 221 deg. F.

Formula from David Algie.

FORMULA NO. 167

Strawberry Preserves

Strawberries, frozen (2 plus 1)	67.5 lb.
Sugar (sucrose)	32.5 lb.
Pectin (No. 100)	2 oz.
Fruit acid solution (Formula No. 18)	6 oz.

Working Directions

Thaw the berries. Drain juice from fruit. Weigh each separately. Use 67.5 lb. of fruit and juice. (Usually the drained fruit weighs 26 lb. and the juice weighs 41.5 lb., but this may vary with the amount of moisture originally present in the fruit when it was packed.) Mix 2 oz. of pectin with part of the sugar and dissolve the dry mixture in 1 gal. of cold juice.

Put main part of juice in a steam-jacketed kettle, add the gallon of juice containing the pectin and sugar, add the remainder of the sugar, and cook to 220 deg. F. Then add the drained fruit and cook to 223 deg. F.

Shut off steam. Add the 6 oz. of fruit acid solution (Formula No. 18).

Cool with gentle stirring to 190 deg. F., if the preserve is to be filled hot into hot jars, which will prevent mold growth. Or, if the jars are to be processed after filling, the temperature of filling and closing may be further reduced.

Formula from David Algie.

FORMULA NO. 168

Imitation Cherry Sirup

Strawberry sirup, 28 Bé	20 gal.
Sugar	105 lb.
Benzoate of soda (dry)	¼ lb.
Raspberry red color (liquid)	8 oz.
Green color (liquid)	30 oz.
Strawberry red color (liquid)	35 oz.
Citric acid..1 lb. dissolved in	1 pt. of water

Mix the above ingredients together and heat to about 150 deg. F. When sugar is completely dissolved, add:

Corn sirup	1 gal.
Cherry extract	52 oz.
Benzaldehyde..80 c.c. mixed with 4 oz.	of alcohol
Yield	30 gal.

Mix thoroughly and fill into jugs.

Directions for Making Colors

Raspberry Red Color Liquid

FD & C, Red No. 2	½ lb.
Benzoate of soda	5 grams
Water to make 1 gal.	

Green Color Liquid

FD & C, Green No. 3	4 oz.
Benzoate of soda	5 grams
Water to make 1 gal.	

Strawberry Red Color Liquid

FD & C, Red No. 1	½ lb.
Benzoate of soda	5 grams
Water to make 1 gal.	

Dissolve the dry powder in about two-thirds of the required water, which may be lukewarm. Then bring up to the desired volume with cold water.

Formula from David Algie.

FORMULA NO. 169

Orange Sirup for Carbonation

Orange concentrate	11 gal.
Water	75 gal.
Benzoate of soda..2 lb. dissolved in 1 gal.	of water
Sugar	1,650 lb.
Orange 1 (liquid) (FD & C Orange No. 1)	10 gal.

Mix the above ingredients together and sugar is completely dissolved. The sirup is best made cold. The water used in dissolving the soda is an additional amount from the 75 gal. shown in the preceding item.

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A very popular, highly spiced sauce seasoner.

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This special blend is for pickled herrings.

SAUSAGE SPICE FOR BOLOGNA No. 1
One of several widely used bologna seasoning blends.

PICKLE SPICE SWEET No. 1-B
This pickle compound is distinguished by a predominant clove-pimento character.

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For completing, either a gum emulsion or pectin emulsion may be added. For a gum emulsion, take:

Oil of orange	8 pt.
Gum arabic	8 lb.
Water	16 pt.

Make an emulsion of these ingredients and add to the sirup.

Yield	240 gal.

Mix thoroughly.

It is to be noted that such an emulsion in carbonated beverages has a tendency to ring the necks of bottles.

Instead of a gum emulsion, a pectin emulsion may be prepared as follows:

Oil of orange	8 pt.
Emulsifying pectin	33 oz.
Water	5½ gal.

Beat the oil and pectin together and, while beating, add the water. Homogenize at 2,000 lb. pressure. If a homogenizer is not available, three good beatings, with a five-minute resting period between each beating, will give satisfactory results.

Formula from David Algie.

FORMULA NO. 170

Grape Sirup for Carbonation

(*Grapeade*)

Water	11 gal.
Benzoate of soda	½ lb.
Grape juice	5 gal.
Sugar	310 lb.
Grape shade (liquid)	1 qt.
Citric acid..3½ lb. dis. in 3 gal. of water	

Mix the above ingredients together and heat to about 150 deg. F. (The water used in dissolving the citric acid is an additional amount from the 11 gal. shown in the first item.)

Then add:

Corn sirup	2 gal.
Grape extract	42 oz.

After mixing, bottle for future use. Throw 2 oz. per 7 oz. bottle and carbonate at a low pressure. If smaller quantities are made for use on the premises, the benzoate of soda need not be used.

Directions for Making Grape Shade

FD & C, Red No. 1	2 oz. dry color
FD & C, Red No. 2	1 oz. dry color
FD & C, Blue No. 2	1 oz. dry color
FD & C, Green No. 3	¼ oz. dry color
FD & C, Yellow No. 5	¼ oz. dry color

Mix the colors dry. Dissolve in water and make up to one gallon with water.

If the grape shade is to be stored for any length of time, add benzoate of soda. A sodium benzoate solution is made by dissolving 2 lb. 13 oz. of benzoate of soda in 3 qt. of hot water. Of this solution, use ½ oz. per gallon of grape shade, substituting this ½ oz. for part of the water that is used in making the grape shade.

Formula from David Algie.

FORMULA NO. 171

Butter Creams (Raw)

Shortening	2 lb.
Butter	1 lb.
Sugar, icing (sucrose)	4 lb. 8 oz.
Condensed maple sirup (2½ fold)	8 oz.

Cream together lightly. Then add slowly

Egg whites	4 oz.
Yield	8 lb. 6 oz.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 172

Butter Cream (Cooked)

Sugar (sucrose)	2 lb. 8 oz.
Corn sirup	2 lb. 8 oz.
Water	Sufficient to dissolve

Cook to 240 deg. F. Then add

Condensed maple sirup (2½ fold)	9 oz.

Separately, beat to a stiff fluff

Egg, white	5 oz.

Add the cooked sirup slowly to the beaten whites, and finally add the following which has been previously creamed:

Shortening	2 lb. 4 oz.
Butter	1 lb.
Yield about	9 lb. 4 oz.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 173

Cambridge Sausage I

(Very popular in England)

Lean pork	12 lb.
Fat	4 lb.
Rice powder, scalded	7 lb.
Dried rusk	¼ lb.
Salt	4 oz.
Pepper	1 oz.
Cayenne	¼ oz.
Pimento (allspice)	¼ oz.
Mace	¼ oz.
Sage (ground)	¼ oz.

The scalded rice is 4⅔ lb. dry rice powder, and 2⅓ lb. hot water. Pass meat and fat separately through mincing machine. Soak rusks in cold water until they form a springy mass. Put meat and rice in a bowl choper, add spices, next the rusk, finally the fat.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

(Turn to page 116)

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FORMULA NO. 174

Cambridge Sausage II

Lean pork	6 lb.
Pork fat	2 lb.
Dried rusk	1½ lb.
Water	3 lb.
Salt	3 oz.
Pepper	1¼ oz.
Mace	1¼ oz.

Working Directions

Soak rusks in cold water until they form a springy mass. Pass meat and fat separately through a mincing machine. Put chopped meat in a bowl chopper, add the spices, then the rusk and lastly the fat.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 175

Veal Style Loaf

Veal trimmings	30 lb.
Beef trimmings	30 lb.
Pork trimmings	20 lb.
Hog stomachs	20 lb.
Dry milk solids	12 lb.
Onions	5 lb.
Bunches of parsley	3
Lemon extract	2 oz.
White pepper	6 oz.
Salt	3 lb.
Quick cure (See Formula No. 23).	1 qt.

Grind and chop meat in usual way, adding ice, cure, dry milk, onions, spices, while chopping. When almost chopped fine enough, add parsley and run a few revolutions.

Put in greased baking pans and bake at 200 to 250 deg. F. for 2½ to 3 hours. Inside temperature should be 152 deg. F.

Cooked loaf can be stuffed in artificial casings of amber color; *adds to the appearance and keeping qualities.*

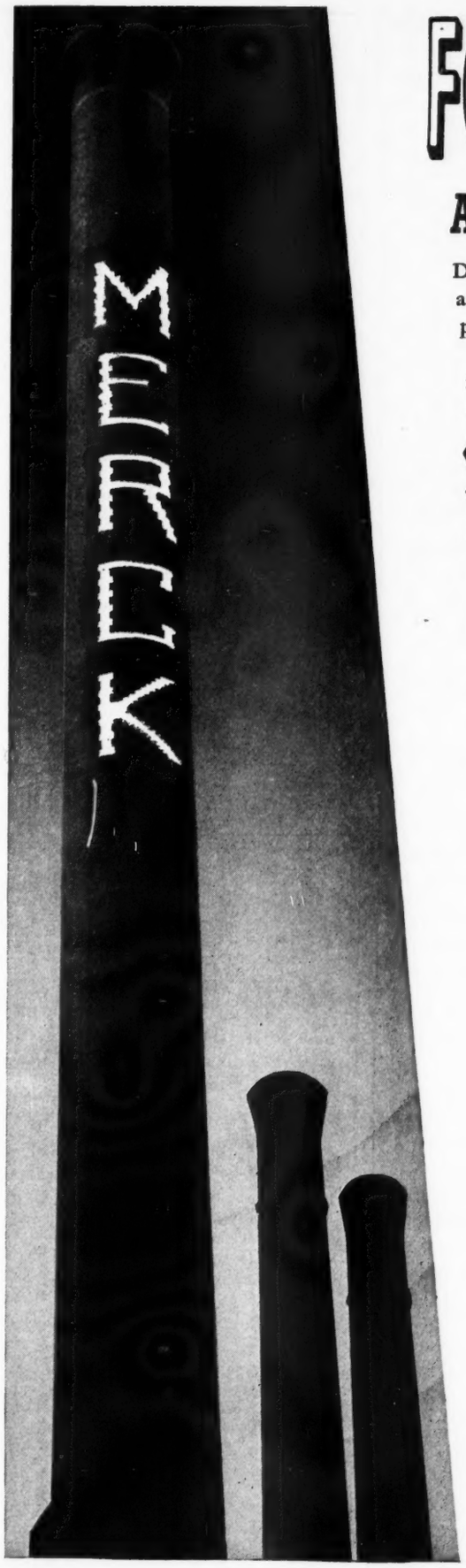
Formula from Dry Milk Institute

FORMULA NO. 176

Frankfurts No. 4

Beef trimmings	35 lb.
Back fat	10 lb.
Hog stomachs	30 lb.
Beef cheeks	15 lb.
*Weasand meat	10 lb.
Dry milk solids	3½ lb.
White pepper	6 oz.
Mace	2 oz.
Ground mustard	3 oz.
Coriander	1 oz.
Onion powder	½ oz.
Garlic powder (optional)	½ oz.
Salt	3 lb.
Quick cure. (See Formula No. 52)	1 qt.

* Weasand meat: trimmings from around the windpipe.



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1934 — *Ascorbic Acid Merck (U.S.P.) was made available by Merck & Co. Inc.*

1936 — *Vitamin B_1 was synthesized in the Merck Research Laboratories.*

1937 — *Vitamin B_1 Crystals Merck (Thiamine Hydrochloride U.S.P.) was made available in commercial quantities.*

1938 — *Nicotinic Acid Merck (U.S.P.) became commercially available.*

1938 — *Riboflavin Merck was the second pure crystalline vitamin to reach commercial production during that year.*

1938 — *Alpha-Tocopherol (Vitamin E) was identified and synthesized by Merck chemists and their collaborators in other laboratories.*

1939 — *Vitamin B_6 was synthesized in the Merck Research Laboratories.*

1940 — *Vitamin B_6 Hydrochloride Merck became available in commercial quantities.*

1940 — *Alpha-Tocopherol Merck (Vitamin E) was made commercially available.*

1940 — *2-Methyl-Naphthoquinone Merck, a pure chemical having marked Vitamin K activity, became available in commercial quantities.*

1940 — *Pantothenic Acid, the most recently synthesized member of the Vitamin B Complex, was identified and synthesized by Merck chemists and their collaborators.*

1940 — *Calcium Pantothenate Dextrorotatory (d-Calcium Pantothenate), the physiologically active form of Pantothenic Acid, was made commercially available by Merck & Co. Inc.*

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Backed by thorough experience, extensive resources, and modern production facilities, Merck & Co. Inc. is fully equipped and prepared to serve the food manufacturer who is interested in adding vitamins to processed foods. Vitamin B_1 Crystals Merck are ideally adapted to incorporation in a variety of food products. By using this pure *crystalline* substance, problems of odor, taste, color, and bulkiness are completely eliminated.

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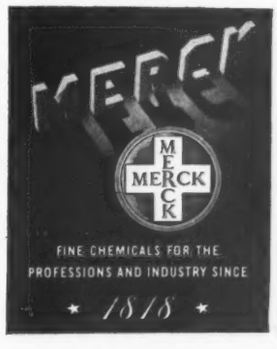
Nicotinamide Merck
Vitamin B_6 Hydrochloride Merck (Pyridoxine Hydrochloride)
d-Calcium Pantothenate Merck
Ascorbic Acid Merck (U.S.P.)
2-Methyl-Naphthoquinone Merck (Vitamin K Active)
Alpha-Tocopherol Merck (Vitamin E)



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See also General Directions (Formula No. 22).

Formula from Dry Milk Institute.

FORMULA NO. 177

Worcestershire Sauce No. 4

Anchovies	4 lb.
Raisins	14 lb.
Lemons	20
Onions	10 lb.
Garlic	2 lb.
Sugar	10 lb.
Salt	8 lb.
Ginger	4 lb.
Mace	½ lb.
Cayenne pepper	½ lb.
Sour sherry wine	12 gal.
Walnut catchup	2 gal.
Horseradish vinegar	1 gal.
Vinegar (16 grain)	14 gal.

The raisins and lemons are chopped fine.

Simmer the mixture for an hour and pass through a pulping machine fitted with a fine sieve.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 178

Home-Style Dill Pickles

This is the original household formula put out by Mrs. C. W. Fanning of Streator, Ill., many years ago to promote the sale of cucumbers from her husband's greenhouse. It is the original basis of Fanning's Bread and Butter Pickles, but has since been much modified by industrial users. Though it needs *much development*, it is published in response to a specific request.—Editors.

1. Large cucumbers, ⅛-in. slices	12
Small pickling onions	4
Dry salt	to cover

Distribute the dry salt over the slices of cucumbers and onions. Let stand for 1 to 2 hours. Drain off and discard the liquid. Make up the following:

2. Vinegar (40 grain, cider)	1 pt.
Sugar (sucrose)	1 lb.
Turmeric (1 tsp.)	1/12 oz.
Mustard seed (white) 1 tsp.	1/12 oz.
Celery seed (1 tsp.)	1/12 oz.
Black pepper corns	Several

Bring (2) to the boiling point. Add the drained sliced pickles and onions (1). Bring again to boiling point and hold for 5 minutes.

Pack in glass containers with the pickling liquid. Process at temperatures from 170 to 185 deg. F. for from 30 to 50 minutes, depending on the size of the jar.

Formula from Mrs. E. W. Fanning, about 1915 to 1920.

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